

Surgery at a Glance

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List of abbreviations

AAA	abdominal aortic aneurysm	ECG	electrocardiogram
AAT	aspartate amino transferase	ER	oestrogen receptor
ABI	ankle-brachial pressure index	ERCP	endoscopic retrograde cholangiopancreatographic (examination)
ACh	acetylcholine	ESR	erythrocyte sedimentation rate
ACN	acute cortical necrosis	ESWL	extracorporeal shock-wave lithotripsy
ACTH	adrenocorticotrophic hormone	FBC	full blood count
ADH	antidiuretic hormone	FCD	fibrocystic disease
Adr	adrenaline	FHx	family history
AF	atrial fibrillation	FNAC	fine-needle aspiration cytology
AFP	α -fetoprotein	FSH	follicle-stimulating hormone
Ag	antigen	5-FU	5-fluorouracil
Alb	albumin	γ -GT	gamma glutamyl transpeptidase
ANCA	anti-neutrophil cytoplasmic antibody	GA	general anaesthetic
AP	anteroposterior	GCS	Glasgow Coma Scale
APTT	activated partial thromboplastin time	GH	growth hormone
ARDS	adult/acute respiratory distress syndrome	GI	gastrointestinal
ARF	acute renal failure	GORD	gastro-oesophageal reflux disease
ATN	acute tubular necrosis	GTN	glyceryl trinitrate
AVM	arteriovenous malfunction	GU	genito-urinary
AXR	abdominal X-ray	Hb	haemoglobin
BCC	basal cell carcinoma	β -HCG	β -human chorionic gonadotrophin
BCG	bacillus Calmette-Guérin	Hct	haematocrit
BE	base excess	HIDA	imido-diacetic acid
BP	blood pressure	HLA	human leucocyte antigen
BPH	benign prostatic hypertrophy	Hx	history
C&S	culture and sensitivity	ICP	intracranial pressure
CABG	coronary artery bypass surgery	ICS	intercostal space
CBD	common bile duct	ICU	intensive care unit
CCF	congestive cardiac failure	IgG	immunoglobulin G
CEA	carcinoembryonic antigen	IPPV	inspiratory positive pressure ventilation
CK	creatine kinase	ITP	idiopathic thrombocytopaenic purpura
CMV	cytomegalovirus	IVC	inferior vena cava
CNS	central nervous system	IVU	intravenous urogram
COCP	combined oral contraceptive pill	JVP	jugular vein pulse
COPD	chronic obstructive pulmonary disease	LAD	left anterior descending
CPK-MB	creatine phosphokinase (cardiac type)	LATS	long acting thyroid stimulating (factor)
CRF	chronic renal failure	LCA	left coronary artery
CRP	C-reactive protein	LDH	lactate dehydrogenase
CSF	cerebrospinal fluid	LFT	liver function test
CT	computed tomography	LH	luteinizing hormone
CVA	cerebrovascular accident	LH-RH	LH-releasing hormone
CVP	central venous pressure	LIF	left iliac fossa
CXR	chest X-ray	LOC	loss of consciousness
DIC	disseminated intravascular coagulation	LOS	lower oesophageal sphincter
DMSA	dimercaptosuccinic acid	LSE	left sternal edge
Dop	dopamine	LSF	lesser sciatic foramen
DPTA	diethylenetriaminepentaacetic acid	LUQ	left upper quadrant
DU	duodenal ulcer	LV	left ventricle
DVT	deep venous thrombosis	LVF	left ventricular failure
EBV	Epstein-Barr virus		

MC + S	microscopy culture and sensitivity	RBC	red blood cell
MCP	metacarpophalangeal	RIA	radioimmunoassay
MEN	multiple endocrine neoplasia	RIF	right iliac fossa
MI	myocardial infarction	RLN	recurrent laryngeal nerve
MM	malignant melanoma	RPLND	retroperitoneal lymph node dissection
MND	motor neurone disease	RUQ	right upper quadrant
MODS	multiple organ dysfunction syndrome	RV	right ventricle
MRI	magnetic resonance imaging	RVF	right ventricular failure
MS	multiple sclerosis	Rx	treatment
MSH	melanocyte-stimulating hormone	SCC	squamous cell carcinoma
MSU	mid-stream urine	SGOT	serum glutamic oxalacetic transaminase
MTP	metatarsophalangeal	SIADH	syndrome of inappropriate antidiuretic hormone secretion
MUGA	multiple uptake gated analysis	SIRS	soluble immune response suppressor
NAdr	noradrenaline	SLE	systemic lupus erythematosus
NG	naso-gastric	SLN	superior laryngeal nerve
NSAID	non-steroidal anti-inflammatory drug	SVC	superior vena cava
NSU	non-specific urethritis	Sxr	skull X-ray
OA	osteoarthritis	T ₃	tri-iodothyronine
OGD	oesophago-gastro-duodenoscopy	T ₄	thyroxine
OGJ	oesophago-gastric junction	TB	tuberculosis
PA	posteroanterior	TCC	transitional cell carcinoma
PCV	packed cell volume	TED	thrombo-embolic deterrent
PE	pulmonary embolism	TIA	transient ischaemic attack
PHx	past history	TNM	tumour, node, metastasis (staging)
PIP	proximal interphalangeal	t-PA	tissue plasminogen activator
PL	prolactin	TPHA	treponema pallidum haemagglutination (test)
PMN	polymorphonuclear leucocyte	TSH	thyroid-stimulating hormone
POVD	peripheral occlusive vascular disease	TURP	transurethral resection of the prostate
PPL	postphlebotic limb	TURT	transurethral resection of tumour
PR	per rectum	U+E	urea and electrolytes
PSA	prostate-specific antigen	UTI	urinary tract infection
PT	prothrombin time	VA	visual acuity
PTC	percutaneous transhepatic cholangiography	VIP	vasoactive intestinal peptide
PTH	parathyroid hormone	VMA	vanillyl mandelic acid
PUD	peptic ulcer disease	VSD	ventricular septal defect
PUO	pyrexia of unknown origin	WCC	white cell count
PV	per vaginam		

Preface

Surgery at a Glance was written primarily as a learning and revision aid for medical students studying for the final MB examination. However, others who would like an overview of clinical surgery, for example, nursing students and some postgraduate surgical students, will also find this book very useful. The book is presented in two parts: part 1 (*Clinical Presentations at a Glance*) concentrates on the symptoms and signs with which patients present, while part 2 (*Surgical Diseases at a Glance*) is concerned with the common surgical diseases that one is likely to see in practice (or in an exam!). Each of the 26 chapters in Part 1 gives a breakdown of the common causes of a particular clinical presentation, for example, abdominal pain, and this section should be especially useful when preparing for the clinical examination. Part 2 comprises 49 chapters on the common diseases encountered in surgery and should be helpful when faced with questions such as 'what do you know about carcinoma of the

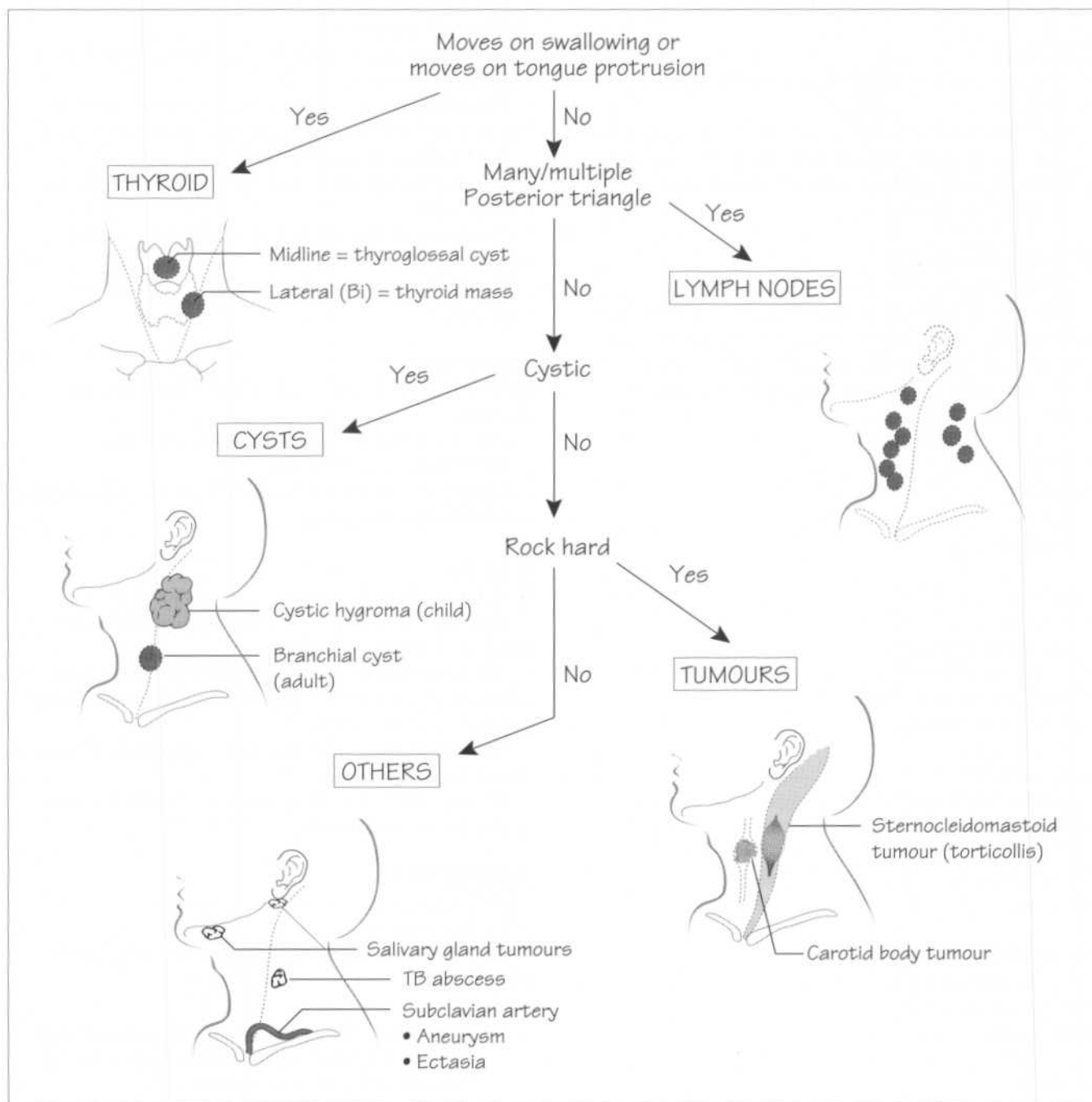
stomach?'. In keeping with the format of the *At a Glance* series, each topic is described in text on one page and illustrated on the opposite page to give an overview of the topic at a glance.

We have had tremendous help from several people in putting this book together. We would like to thank the many medical students who read various parts of the book and gave us good ideas for their help. Books would never appear without publishers, and we would like to thank Andrew Robinson, Michael Stein, Patricia Hardcastle and Lorna Hind at Blackwell Science for their encouragement, patience and professionalism in bringing the project to fruition. We thank Jane Fallows especially for her excellent illustrations.

Pierce Grace
Neil Borley

Part 1 Clinical Presentations at a Glance

1 Neck lump



Definition

A neck lump is any congenital or acquired mass arising in the anterior or posterior triangles of the neck between the clavicles inferiorly and the mandible and base of skull superiorly.

Key points

- Thyroid swellings move upwards (with the trachea) on swallowing.
- Most abnormalities of the neck are visible as swellings.
- Central lumps attached to the hyoid bone, such as thyroglossal cysts, move upwards with both swallowing and protrusion of the tongue.

Differential diagnosis

- 50% of neck lumps are thyroid in origin.
- 40% of neck lumps are caused by malignancy (80% metastatic usually from primary lesion above the clavicle; 20% primary neoplasms: lymphomas, salivary gland tumours).
- 10% of neck lumps are inflammatory or congenital in origin.

Thyroid

- Goitre.
- Cyst.
- Neoplasm.

Neoplasm

- Metastatic.
- Primary lymphoma.
- Salivary gland tumour.
- Sternocleidomastoid tumour.
- Carotid body tumour.

Inflammatory

- Acute infective adenopathy.
- Collar stud abscess.
- Cystic hygroma.
- Branchial cyst.
- Parotitis.

Congenital

- Thyroglossal duct cyst.
- Dermoid cyst.
- Torticollis.

Vascular

- Subclavian aneurysm.
- Subclavian ectasia.

Features

Children

Congenital and inflammatory lesions are common.

- Cystic hygroma: in infants, base of the neck, brilliant transillumination, 'come and go'.
- Thyroglossal or dermoid cyst: midline, discrete, elevates with tongue protrusion.
- Torticollis: rock-hard mass, more prominent with head flexed, associated with fixed rotation (a fibrous mass in the sternocleidomastoid muscle).
- Branchial cyst: anterior to the upper third of the sternocleidomastoid.
- Viral/bacterial adenitis: usually affects jugular nodes, multiple, tender masses.
- Neoplasms are unusual in children (lymphoma most common).

Young adults

Inflammatory neck masses and thyroid malignancy are common.

- Viral (e.g. infectious mononucleosis) or bacterial (tonsillitis/pharyngitis) adenitis.
- Papillary thyroid cancer: isolated, non-tender, thyroid mass, possible lymphadenopathy.

Over-40s

Neck lumps are malignant until proven otherwise.

- Metastatic lymphadenopathy: multiple, rock-hard, non-tender, tendency to be fixed.
- 75% in primary head and neck (thyroid, nasopharynx, tonsils, larynx, pharynx), 25% from infraclavicular primary (stomach, pancreas, lung).
- Primary lymphadenopathy (thyroid, lymphoma): fleshy, matted, rubbery, large size.
- Primary neoplasm (thyroid, salivary tumour): firm, non-tender, fixed to tissue of origin.

Investigations

- FBC: lymphoma, leukaemia, viral illnesses.
- T₄: thyroid disease.
- Chest X-ray: tracheal deviation/compression, pulmonary tumours.
- 'Specials'.

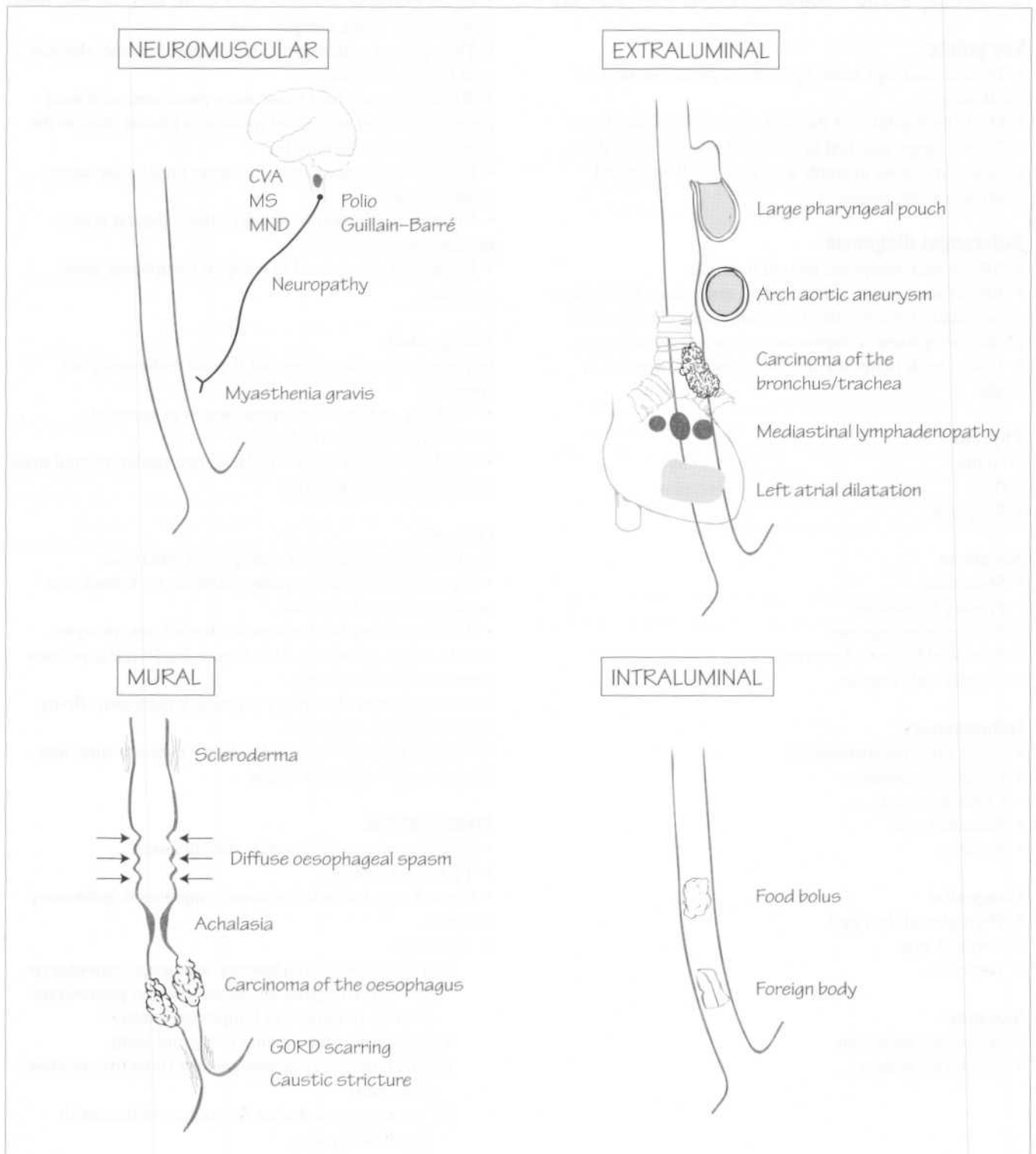
Full examination: fundoscopy, auroscopy, nasopharyngoscopy, laryngoscopy, bronchoscopy, gastroscopy (sources of tumour in lymphadenopathy).

Thyroid scan: ?functioning of thyroid lump.

FNAC: tumours, lymphadenopathy (infective, reactive, malignant).

CT scan: upper abdomen for sources of tumour in lymphadenopathy.

2 Dysphagia



Definition

Dysphagia literally means difficulty with swallowing, which may be associated with ingestion of solids or liquids or both.

Key points

- Most causes of dysphagia are oesophageal in origin.
- In children, foreign bodies and corrosive liquids are common causes.
- In young adults, reflux stricture and achalasia are common.
- In the elderly, carcinoma and reflux are common.
- Because the segmental nerve supply of the oesophagus corresponds to the intercostal dermatomes, a patient with dysphagia can accurately pinpoint the level of obstruction.

Differential diagnosis

Congenital

- Tracheo-oesophageal fistula—recurrent chest infections, coughing after drinking.

Inflammatory

- Caustic stricture: physical examination shows corrosive ingestion, chronic dysphagia, onset may be months after.
- Foreign body: acute onset, marked retrosternal discomfort, dysphagia even to saliva is characteristic.
- Reflux oesophagitis and stricture: preceded by heartburn, progressive course, nocturnal regurgitation.

Neoplasm

- Carcinoma of the oesophagus: progressive course, associated weight loss and anorexia, low-grade anaemia, possible small haematemesis.

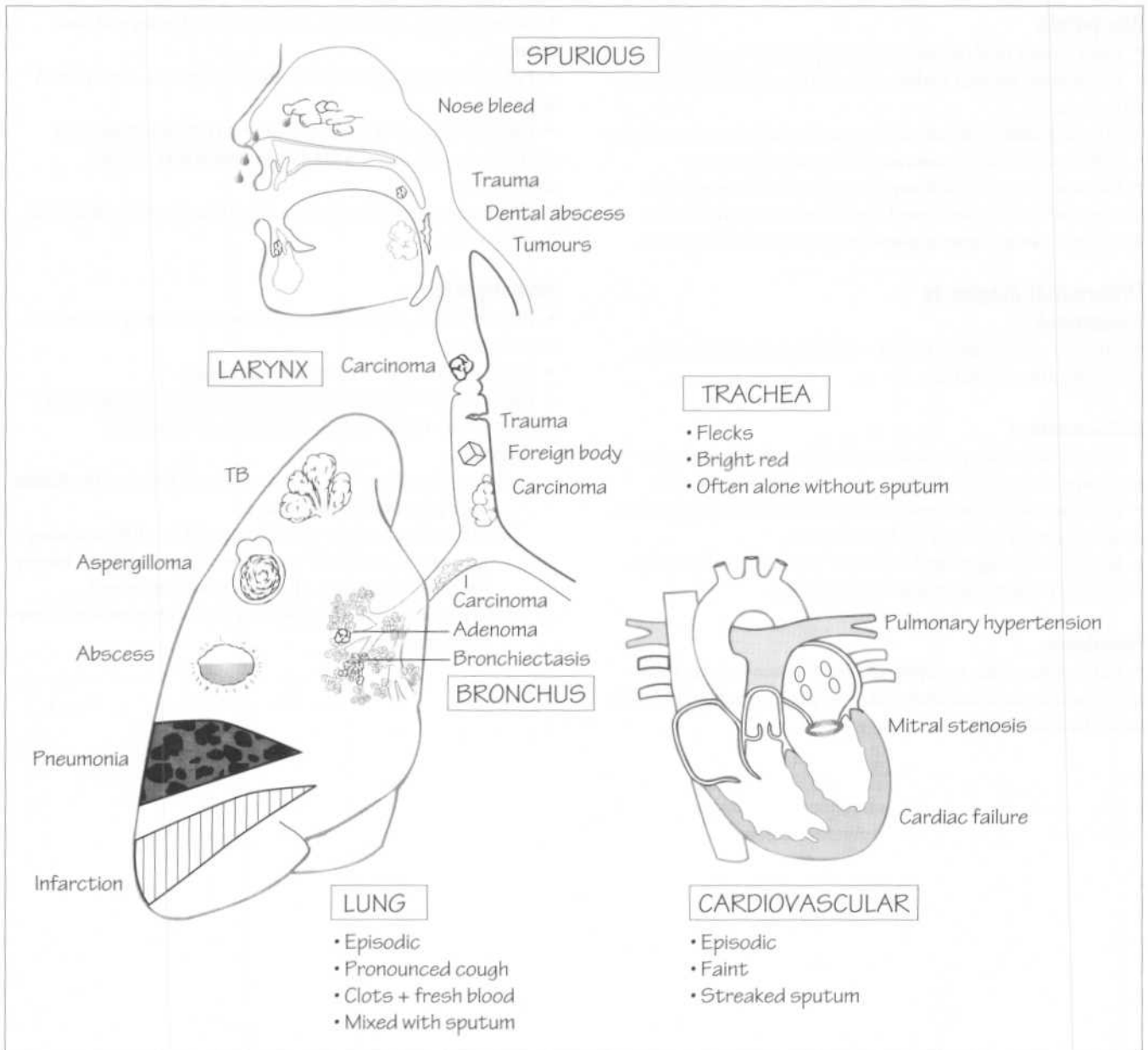
Other

- Achalasia: onset in young adulthood or old age, liquids disproportionately difficult to swallow, frequent regurgitation, recurrent chest infections.
- Scleroderma: slow onset, associated with skin and hair changes.
- Pulsion diverticulum: intermittent symptoms, unexpected regurgitation.
- Chagas' disease (*Trypanosoma cruzi*): South American prevalence, associated with dysrhythmias and colonic dysmotility.
- External compression: mediastinal lymph nodes, left atrial hypertrophy.

Investigations

- FBC: anaemia (tumours much more commonly cause this than reflux).
- ECG: evidence of left atrial hypertrophy.
- Chest X-ray (AP and lateral) for suspected foreign body, prominent air fluid level characteristic of achalasia.
- 'Specials':
 - Barium swallow: low risk, easy, good for possible fistula, high tumour, diverticulum.
 - OGD: moderate risk, specialist, good for differentiating tumour vs. achalasia vs. reflux stricture, allows biopsy for tissue diagnosis, allows possible treatment.
 - CT scan: low risk, good for extrinsic compression, allows tumour staging.

3 Haemoptysis



Definition

Haemoptysis (blood spitting) is the symptom of coughing up blood from the lungs. Blood from the nose, mouth or pharynx that may also be spat out is termed 'spurious haemoptysis'.

Key points

- Blood from the proximal bronchi or trachea is usually bright red. It may be frankly blood or mixed with mucus and debris particularly from a tumour.
- Blood from the distal bronchioles and alveoli is often pink and mixed with frothy sputum.

Differential diagnosis

The sources, causes and features are listed below.

Spurious haemoptysis

Mouth and nose

- Blood dyscrasias: associated nose bleeds, spontaneous bruising.
- Scurvy (vitamin C deficiency): poor hair/teeth, skin bruising.
- Dental caries, trauma, gingivitis.
- Oral tumours: painful intraoral mass, discharge, fetor.
- Hypertensive/spontaneous: no warning, brief bleed, often recurrent.
- Nasal tumours (common in South East Asia).

True haemoptysis

Larynx and trachea

- Foreign body: choking, stridor, pain.
- Carcinoma: hoarse voice, bovine cough.

Bronchus

- Carcinoma: spontaneous haemoptysis, chest infections, weight loss, monophonic wheezing.

- Adenoma (e.g. carcinoid): recurrent chest infections, carcinoid syndrome.
- Bronchiectasis: chronic chest infections, fetor, blood mixed with purulent sputum, physical examination shows TB or severe chest infections.
- Foreign body: recurrent chest infections, sudden onset inexplicable 'asthma'.

Lung

- TB: weight loss, fevers, night sweats, dry or productive cough.
- Pneumonia/lung abscess: features of acute chest sepsis, swinging fever.
- Pulmonary infarct (secondary to PE): pleuritic chest pain, tachypnoea, pleural rub.
- Aspergilloma.

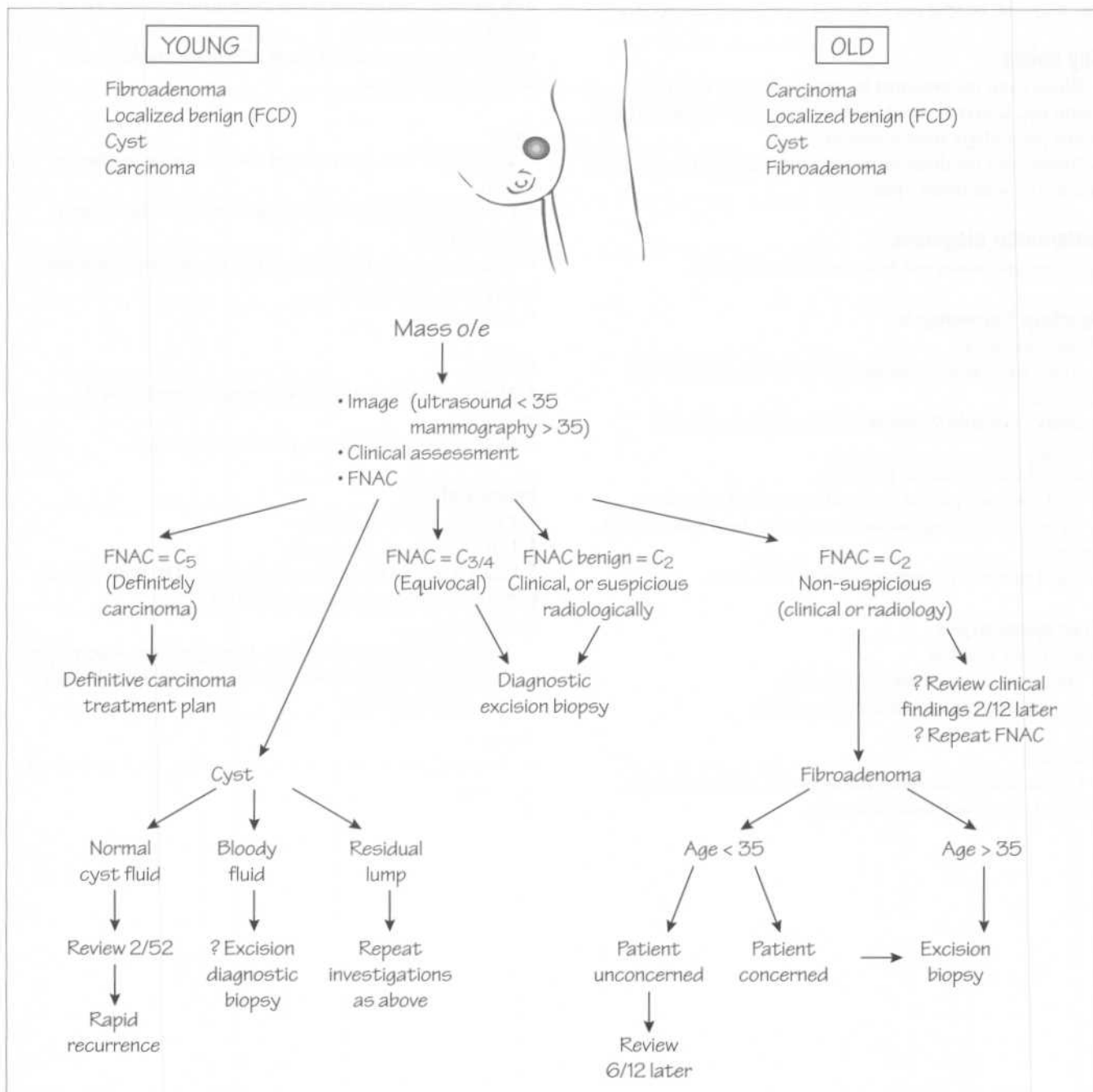
Cardiac

- Mitral stenosis: frothy pink sputum, recurrent chest infections.
- LVF: frothy pink sputum, pulmonary oedema.

Investigations

- Clotting: blood dyscrasias.
- FBC: infections, dyscrasias.
- Chest X-ray (AP and lateral): tumours, TB, aspergilloma, pneumonia, abscess, foreign body, LVF.
- 'Specials'.
 - CT scan: tumours (staging), bronchiectasis, aspergilloma.
 - Bronchoscopy: tumours (cytology, histology), foreign body (removal).

4 Breast lump



Definition

A breast lump is defined as any palpable mass in the breast. A breast lump is the most common presentation of both benign and malignant breast disease. Enlargement of the whole breast can occur either uni- or bilaterally, but this is not strictly a breast lump.

Key points

- The commonest breast lumps occurring under the age of 35 years are fibroadenomas and fibrocystic disease.
- The commonest breast lumps occurring over the age of 50 years are carcinomas and cysts.
- Pain is more characteristic of infection/inflammation than tumours.
- Skin/chest wall tethering is more characteristic of tumours than benign disease.
- Multiple lesions are usually benign (cysts or fibrocystic disease).

Differential diagnosis

Swelling of the whole breast

Bilateral

- Pregnancy, lactation.
- Idiopathic hypertrophy.
- Drug induced (e.g. stilboestrol, cimetidine).

Unilateral

- Enlargement in the newborn.
- Puberty.

Localized swellings in the breast

Mastitis/breast abscess

- During lactation: red, hot, tender lump, systemic upset.

- Tuberculous abscess: chronic, 'cold', recurrent, discharging sinus.

Cysts

- Galactocele: commoner postpartum, tender but not inflamed, milky contents.
- Fibrocystic disease: irregular, ill defined, often tender.

Solid lumps

- Benign.

Fibroadenoma: discrete, firm, well defined, regular, highly mobile.

Fat necrosis: irregular, ill defined, hard, ?skin tethering.

Lipoma: well defined, soft, non-tender, fairly mobile.

Cystosarcoma phylloides: wide surgical excision (10% are malignant).

- Malignant.

Carcinoma: early: ill defined, hard, irregular, skin tethering; late: spreading fixity, ulceration, fungation, 'peau d'orange'.

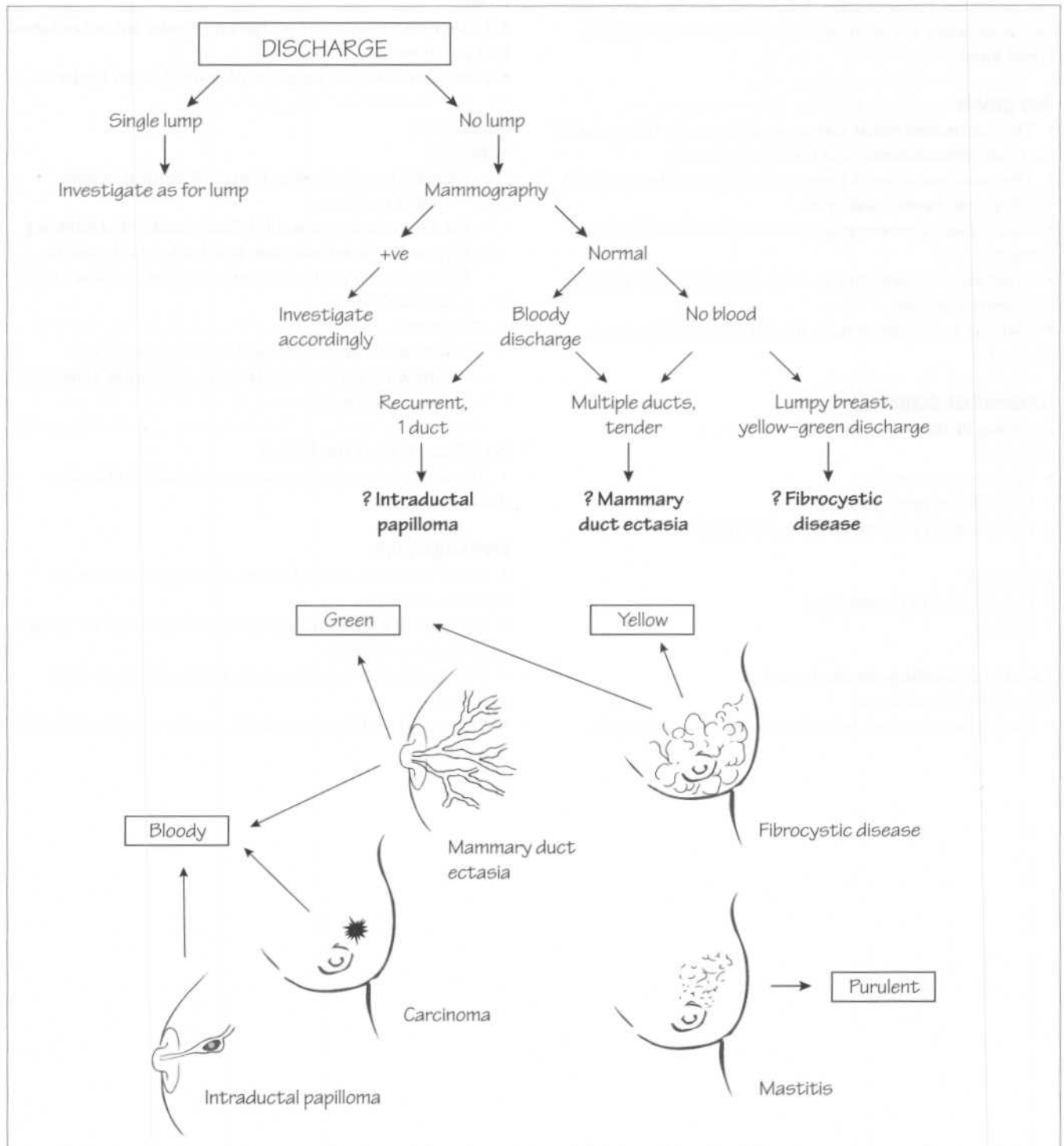
Swellings behind the breast

- Rib deformities, chondroma, costochondritis (Tietze's disease).

Investigations

- FNAC: tumours, fibroadenoma, fibrocystic disease, fat necrosis, mastitis.
- Ultrasound: fibroadenoma, cysts, tumours (best for young women/dense breasts).
- Mammography: tumours, cysts, fibrocystic disease, fat necrosis.
- Biopsy ('Trucut'/open surgical): usually provides definitive histology.

5 Nipple discharge



Definition

Any fluid (which may be physiological or pathological) emanating from the nipple.

Key points

- Milky discharge is rarely pathological.
- Purulent discharge is usually benign.
- Bloody discharge is often associated with neoplasia.
- If a lump is present, always investigate 'for the lump' rather than 'for the discharge'.

Differential diagnosis

Physiological discharges

Milky or clear

- Lactation.
- Lactorrhoea in the newborn ('witches' milk').
- Lactorrhoea at puberty (may be in either sex).

Pathological discharges

Serous yellow-green

- Fibrocystic disease: cyclical, tender, lumpy breasts.

- Mammary duct ectasia: usually multiple ducts, intermittent, may be associated with low-grade mastitis.

Bloody

- Duct papilloma: single duct, ?retro-areolar, 'pea-sized' lump.
- Carcinoma: ?palpable lump.
- Mammary duct ectasia: usually multiple ducts, intermittent, may be associated with low-grade mastitis.

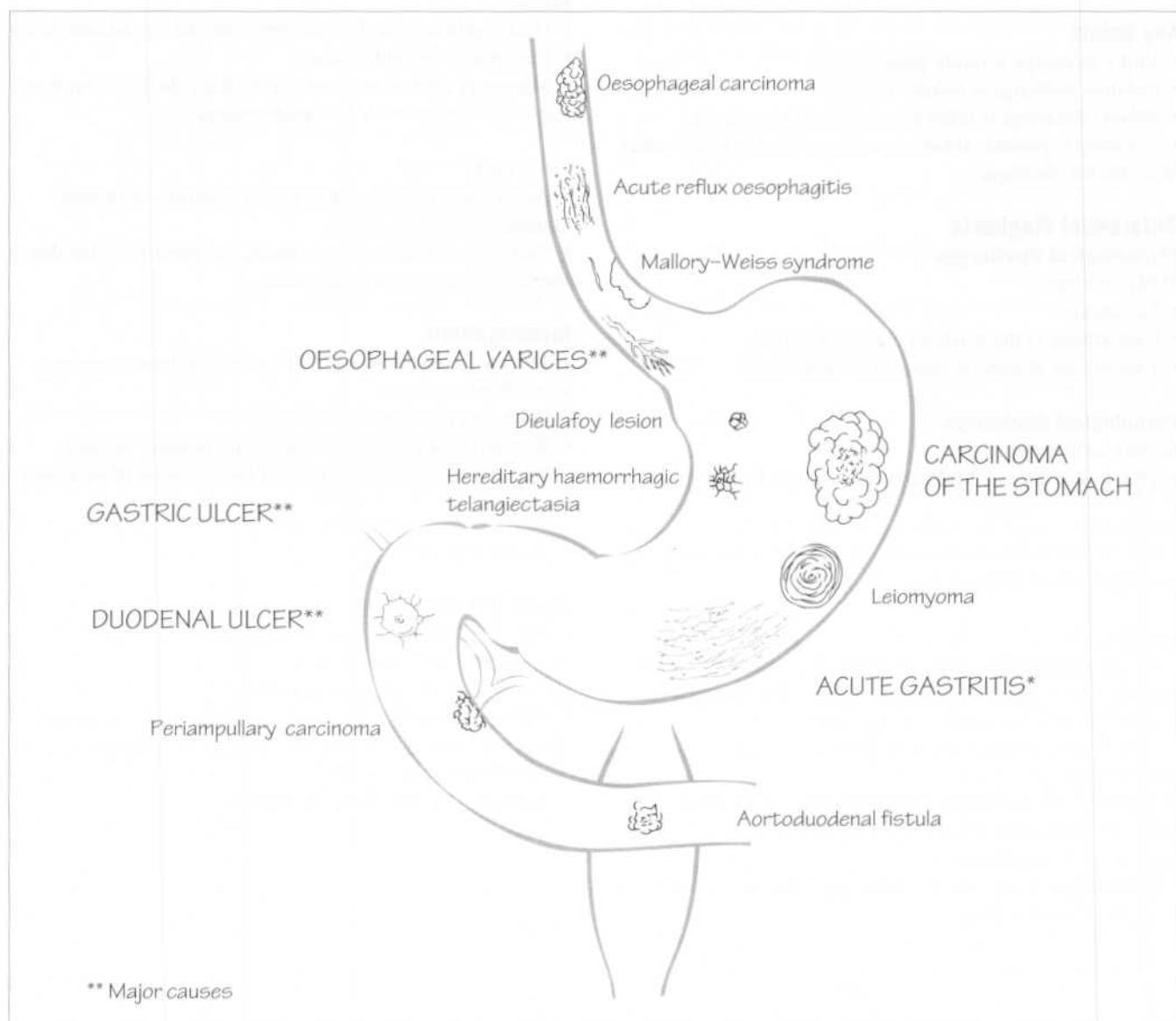
Pus ± milk

- Acute suppurative mastitis: tender, swollen, hot breast, multiple ducts discharging.
- Tuberculous (rare): chronic discharge, periareolar fistulae, 'sterile' cultures on normal media.

Investigations

- MC + S: acute mastitis, TB (Lowenstein–Jensen medium, Ziehl–Neelsen stains).
- Discharge cytology: carcinoma.
- Mammography: tumours, fibrocystic disease, ?ectasia.
- Ductal excision: may be needed for exclusion of neoplasia.

6 Haematemesis



Definitions

GI bleeding is any blood loss from the GI tract (from the mouth to the anus), which may present with haematemesis, melaena, rectal bleeding or anaemia. *Haematemesis* is defined as vomiting blood and is usually caused by upper GI disease. *Melaena* is the passage per rectum of a black treacle-like stool that contains altered blood usually as a result of proximal bowel bleeding.

Key points

- Haematemesis is usually caused by lesions proximal to the duodeno-jejunal junction.
- Melaena may be caused by lesions anywhere from oesophagus to colon.
- Most tumours more commonly cause anaemia than frank haematemesis.
- In young adults, peptic ulcer disease, congenital lesions and varices are common causes.
- In the elderly, tumours and peptic ulcer disease are common causes.

Differential diagnosis

The sources, causes and features are listed below.

- Spurious haematemesis, i.e. vomiting swallowed blood, e.g. from epistaxis or haemoptysis.

Oesophagus

- Reflux oesophagitis: small volumes, bright red, associated with regurgitation, physical examination of reflux symptoms.
- Bleeding varices: sudden onset, painless, large volumes, dark red blood, physical examination shows portal hypertension.
- Trauma during vomiting (Mallory–Weiss syndrome): bright red bloody vomit usually preceded by several normal but forceful vomiting episodes.
- Oesophageal carcinoma (rare): scanty, blood-stained debris, rarely significant volume.

Stomach

- Erosive gastritis: small volumes, bright red, may follow alcohol or NSAID intake/stress, ?physical examination of dyspeptic symptoms.
- Gastric ulcer: often larger sized bleed, painless, ?herald smaller bleeds, accompanied by altered blood ('coffee grounds'), physical examination of peptic ulcer disease.
- Gastric cancer: rarely large bleed, anaemia commoner, associated weight loss, anorexia, dyspeptic symptoms.
- Gastric leiomyoma (rare): spontaneous onset moderate-sized bleed, no physical examination.
- Gastric lymphoma (rare).
- Dieulafoy's disease (rare): younger patients, spontaneous large bleed.
- Hereditary telangiectasia (rare) (Rendu–Osler–Weber disease).

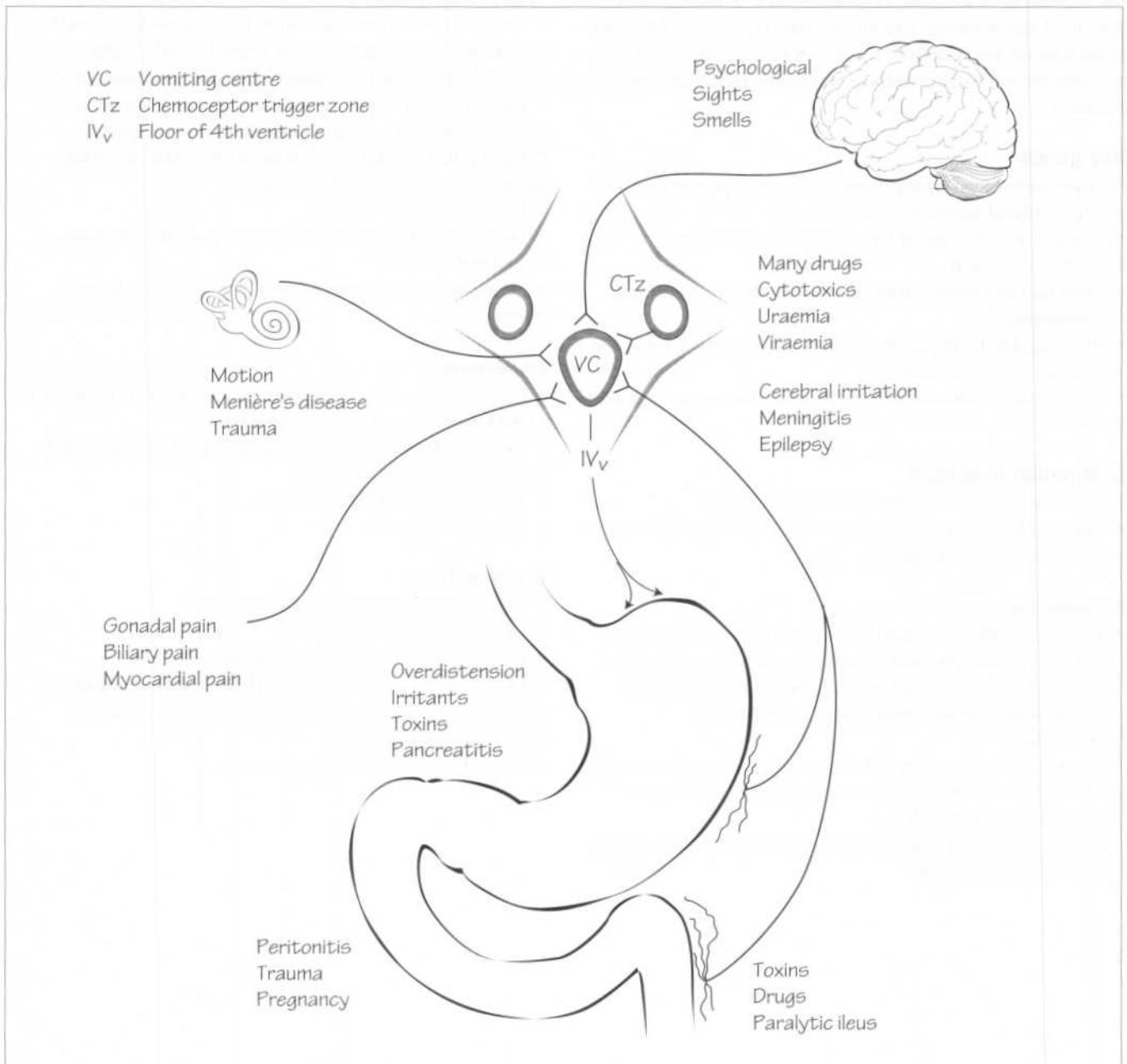
Duodenum

- Duodenal ulcer: melaena often also prominent, symptoms of back pain, hunger pains, NSAID use.
- Aortoduodenal fistula (rare): usually post-infected AAA repair, massive haematemesis.
- Periampullary carcinoma (rare).
- Haemobilia (rare).

Investigations

- FBC: carcinomas, reflux oesophagitis.
- LFTs: liver disease (varices).
- Clotting: alcohol, bleeding diatheses.
- OGD: investigation of choice. High diagnostic accuracy, allows therapeutic manoeuvres also (varices — injection; ulcers — injection/cautery).
- Angiography: rare duodenal causes.

7 Vomiting



Definitions

Vomiting is defined as the involuntary return to, and forceful expulsion from, the mouth of all or part of the contents of the stomach. *Waterbrash* is the sudden secretion and accumulation of saliva in the mouth as a reflex associated with dyspepsia. *Retching* is the process whereby forceful contractions of the diaphragm and abdominal muscles occur without evacuation of the stomach contents.

Key points

- Vomiting is initiated when the vomiting centre in the medulla oblongata is stimulated, either directly (central vomiting) or via various afferent fibres (reflex vomiting).

Differential diagnosis

Central vomiting

- Drugs, e.g. morphine sulphate, chemotherapeutic agents.
- Uraemia.
- Viral hepatitis.
- Hypercalcaemia of any cause.
- Acute infections, especially in children.
- Pregnancy.

Reflex vomiting

Gastrointestinal causes

- Ingestion of irritants.
 - Bacteria, e.g. salmonella (gastroenteritis).
 - Emetics, e.g. zinc sulphate, ipecacuanha.
 - Drugs, e.g. alcohol, salicylates (gastritis).
 - Poisons, e.g. salt, arsenic, phosphorus.
- Peptic ulcer disease: especially gastric ulcer; vomiting relieves the pain.

- Intestinal obstruction.

Hour-glass stomach (carcinoma of the stomach).

Pyloric stenosis—child: hypertrophic pyloric stenosis, projectile vomiting; adult: pyloric outlet obstruction secondary to PUD or malignant disease.

Small bowel obstruction: adhesions, hernia, neoplasm, Crohn's disease.

Large bowel obstruction: malignancy, volvulus, diverticular disease.

- Inflammation: appendicitis, peritonitis, pancreatitis, cholecystitis, biliary colic.

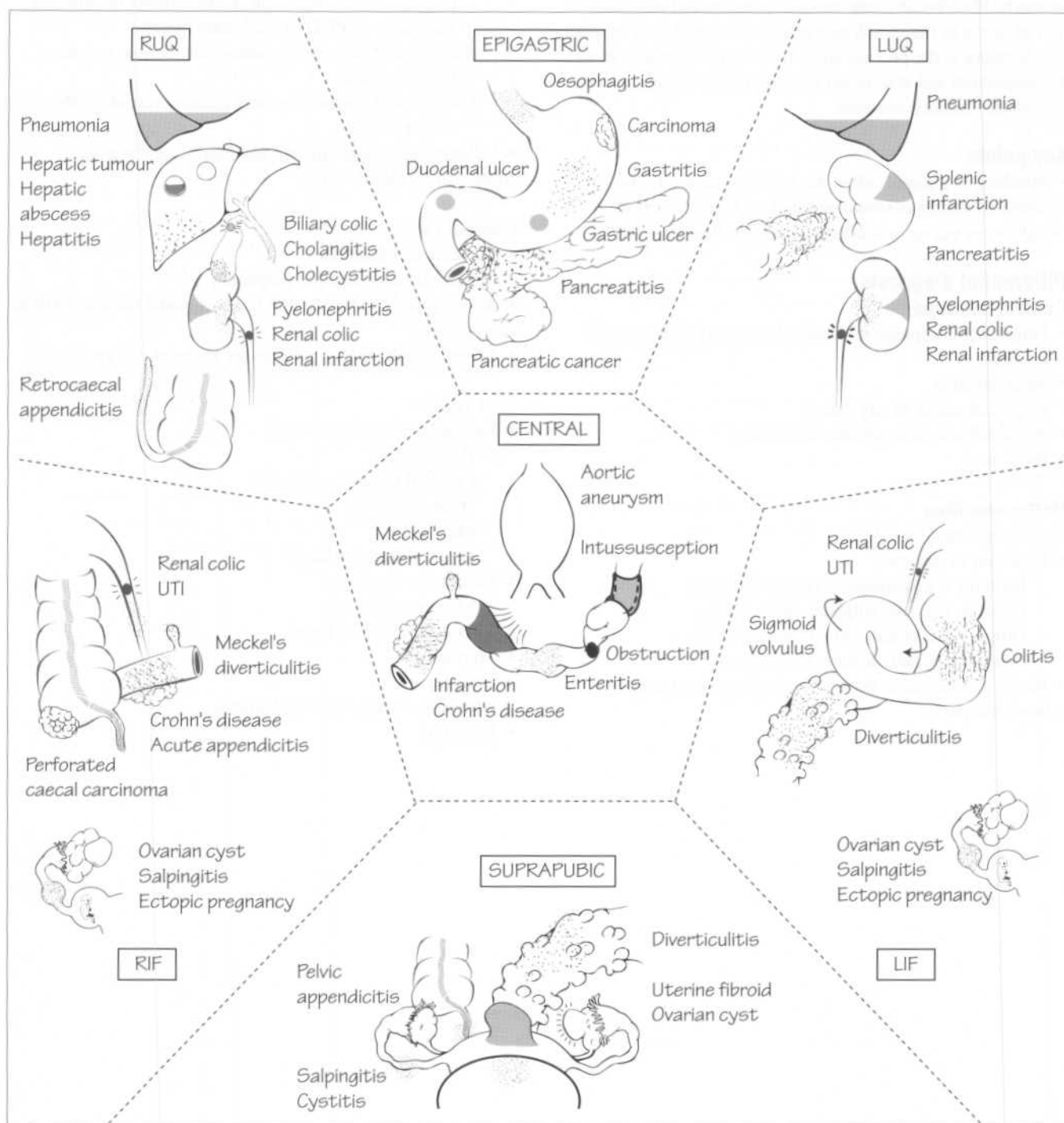
General causes

- Myocardial infarction.
- Ovarian disease, ectopic pregnancy.
- Severe pain (e.g. kick to the testis, gonadal torsion, blow to epigastrium).
- Severe coughing (e.g. pulmonary tuberculosis, pertussis).

CNS causes

- Raised intracranial pressure.
 - Head injury.
 - Cerebral tumour or abscess.
 - Hydrocephalus.
 - Meningitis.
 - Cerebral haemorrhage.
- Middle ear disorders.
 - Menière's disease.
 - Travel/motion sickness.
- Migraine.
- Epilepsy.
- Offensive sights, tastes and smells.
- Hysteria.

8 Acute abdominal pain



Definitions

Abdominal pain is a subjective unpleasant sensation felt in any of the abdominal regions, which may be *acute* (sudden onset) or *chronic* (persists for longer than a few days and may be present intermittently for months or years). *Referred pain* is the perception of pain in an area remote from the site of origin of the pain.

Key points

- The level of abdominal pain generally relates to the origin: foregut = upper; midgut = middle; hindgut = lower.
- Generally, colicky (*visceral*) pain is caused by stretching or contracting a hollow viscus (e.g. gallbladder, ureter, ileum).
- Generally, constant localized (*somatic*) pain is caused by peritoneal irritation and indicates the presence of inflammation/infection (e.g. pancreatitis, cholecystitis, appendicitis).
- Generally, very severe pain indicates ischaemia or generalized peritonitis (e.g. mesenteric infarction, perforated duodenal ulcer).
- Referred causes of pain: pneumonia (right lower lobe), myocardial infarction, lumbar nerve root pathology.

Investigations

- FBC: leucocytosis, infective/inflammatory diseases, anaemia, occult malignancy, peptic ulcer disease.

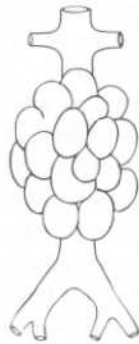
- LFTs: usually abnormal in cholangitis, may be abnormal in acute cholecystitis.
- Amylase: serum level > 1000 iu diagnostic of pancreatitis. Serum level 500–1000 iu, ?pancreatitis, perforated ulcer, bowel ischaemia, severe sepsis. Serum level raised < 500 iu, non-specific indicator of pathology.
- β -HCG (serum): ectopic pregnancy.
- Arterial blood gases: metabolic acidosis — ?bowel ischaemia, peritonitis, pancreatitis.
- MSU: urinary tract infection (++ve nitrites, blood, protein), renal stone (++ve blood).
- ECG: myocardial infarction.
- Chest X-ray: perforated viscus (free gas), pneumonia.
- Abdominal X-ray: ischaemic bowel (dilated, thickened oedematous loops), pancreatitis ('sentinel' dilated upper jejunum), cholangitis (air in biliary tree), acute colitis (dilated, oedematous, featureless colon), acute obstruction, renal stones (radiodense opacity in renal tract).
- Ultrasound: intra-abdominal abscesses (diverticular, appendicular, pelvic), acute cholecystitis/empyema, ovarian pathology (cyst, ectopic pregnancy), trauma (liver/spleen haematoma), renal infections.
- OGD: ?peptic ulcer.
- CT scan: pancreatitis, trauma (liver/spleen/mesenteric injuries), diverticulitis?, leaking aortic aneurysm.
- IVU: renal stones, renal tract obstruction.

9 Abdominal swellings (general)

'FLIPPING BIG MASS'



Mesenteric cyst



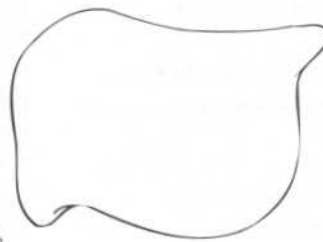
Lymphadenopathy



Ovarian cyst



Fibroid in uterus

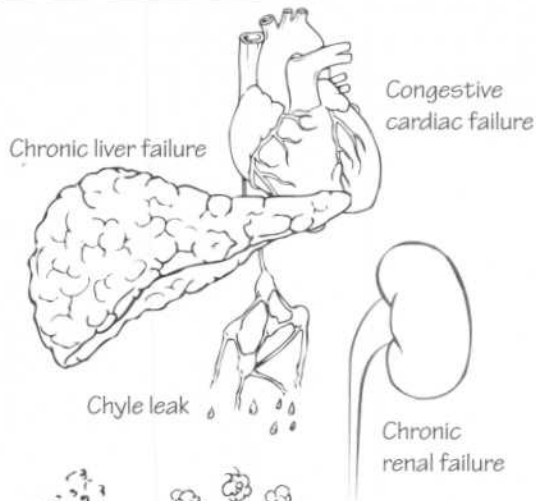


Massive
hepatomegaly



Massive
splenomegaly

CAUSES OF ASCITES



Chronic liver failure

Congestive
cardiac failure

Chyle leak

Chronic
renal failure

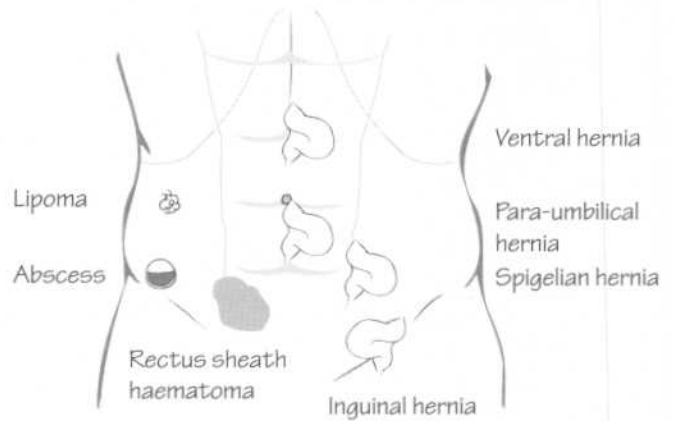


Chronic peritonitis



Carcinomatosis

ABDOMINAL WALL SWELLINGS



Lipoma

Abscess

Rectus sheath
haematoma

Inguinal hernia

Ventral hernia

Para-umbilical
hernia

Spigelian hernia

Definition

An abdominal swelling is an abnormal protuberance that arises from the abdominal cavity or the abdominal wall and may be general or localized, acute or chronic, cystic or solid.

Key points

- Generalized abdominal swellings affect the entire abdominal cavity.
- Localized swellings can be located in the various regions of the abdomen.
- Abdominal wall swellings can be differentiated from intra-abdominal swellings by asking the patient to raise his or her head from the couch (intraperitoneal swellings disappear while abdominal wall swellings persist).

Differential diagnosis

The sources, causes and features of swelling are listed below.

'Fat'

- Obesity: deposition of fat in the abdominal wall and intra-abdominally (extraperitoneal layer, omentum and mesentery). Clinical obesity is present when a person's body weight is 120% greater than that recommended for height, age and sex (body mass index).

'Flatus'

- Intestinal obstruction: swallowed air accumulates in the bowel causing distension. This gives a tympanic note on percussion and produces the characteristic air–fluid levels and 'ladder' pattern on an abdominal radiograph. Sigmoid volvulus produces gross distension with a characteristic distended loop on abdominal X-ray.

'Fluid'

- Intestinal obstruction: as well as air, fluid accumulates in the obstructed intestine.
- Ascites: fluid accumulates in the peritoneal cavity due to the 'six Cs':
 - chronic peritonitis (e.g. tuberculosis, missed appendicitis);
 - carcinomatosis (malignant deposits, especially ovary, stomach);
 - chronic liver disease (cirrhosis, secondary deposits, portal or hepatic vein obstruction, parasitic infections);
 - congestive heart failure (RVF);
 - chronic renal failure (nephrotic syndrome);
 - chyle (lymphatic duct disruption).

'Faeces'

- Chronic constipation: faeces accumulate in the colon producing abdominal distension. Congenital causes include spina bifida and Hirschsprung's disease. Acquired causes include emotional disorders, chronic dehydration, drugs (opiates, anticholinergics, phenothiazines) and hypothyroidism.

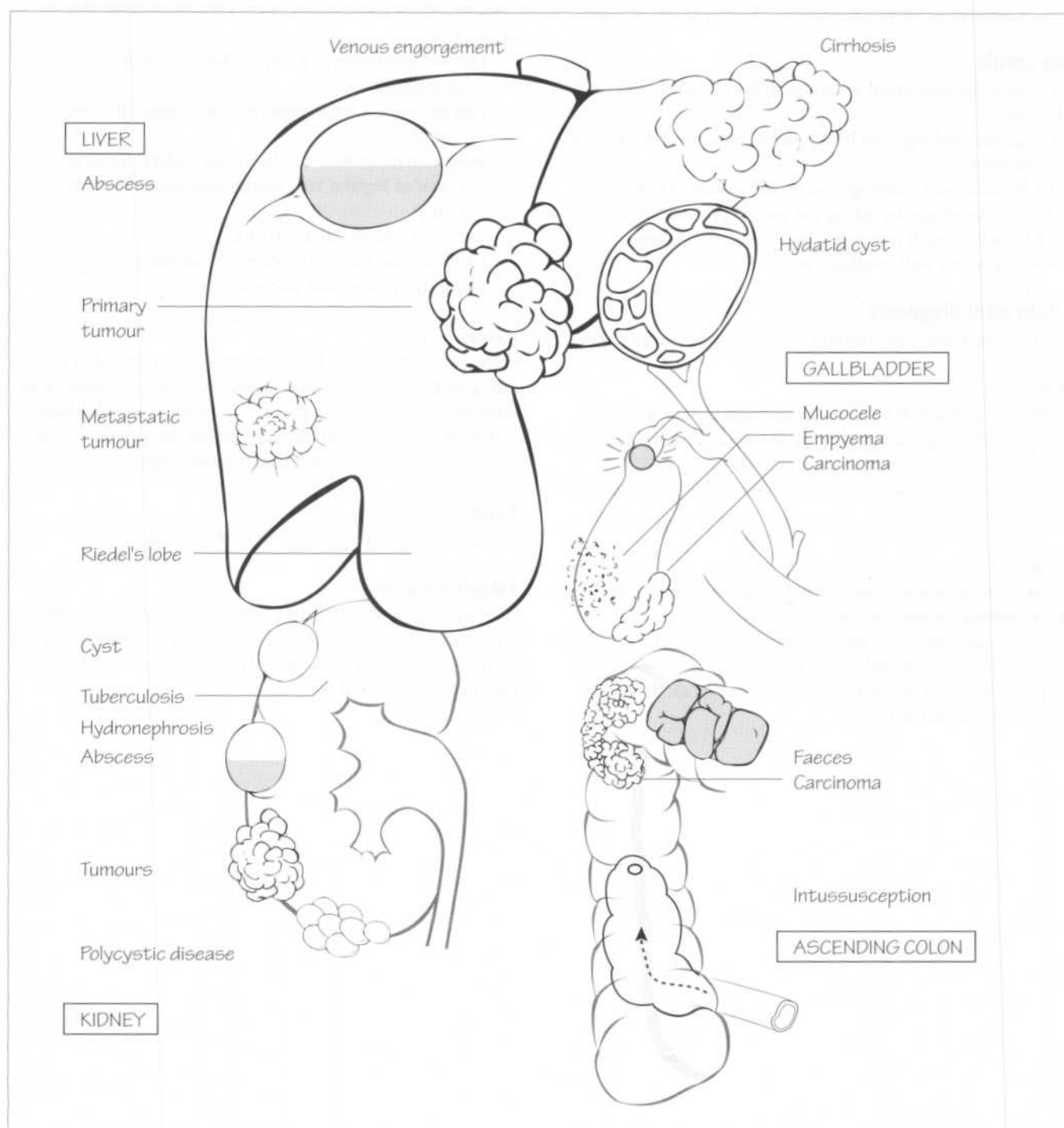
'Fetus'

- Pregnancy: swelling arises out of the pelvis.

'Flipping big mass'

- Usually cystic lesions: giant ovarian cystadenoma, mesenteric cyst, retroperitoneal lymphadenopathy (lymphoma), giant uterine fibroid, giant splenomegaly, giant hepatomegaly, giant renal tumour, desmoid tumour.

10 Abdominal swellings (localized): right hypochondrial swelling



Liver

- Generally: moves with respiration, enlarges towards RIF, dull to percussion, cannot 'get above', clear lower border.
- Riedel's lobe: smooth, non-tender, lateral/right lobe, 'tongue-like', men < women.
- Infective hepatitis: smooth, tender, global enlargement.
- Liver abscess: usually one large abscess, ?amoebic, very tender, systemically unwell.
- Hydatid cyst: smooth, may be loculated, ?history of tropical travel.
- Venous congestion: smooth, tender, pulsatile (slightly irregular (cirrhotic) if chronic).
- Cirrhosis: irregular, firm, 'knobbly'.
- Tumours.

Primary: solitary, large, non-tender, ?lobulated.

Secondary: often multiple, irregular, rock hard, centrally umbilicated.

Gallbladder

- Generally: oval, smooth, projects towards RIF, beneath the tip of the ninth rib, moves with respiration.
- Mucocele: large gallbladder, moderately tender, smooth walled.
- Empyema: acutely tender, difficult to palpate clearly because of pain.
- Carcinoma of gallbladder: nodular, hard, irregular.

Right kidney

- Generally: moves with respiration, bimanually palpable, resonant to percussion due to overlying bowel.
- TB.

- Perinephric abscess/pyonephrosis: acutely tender, systemic signs, rarely large.
- Hydronephrosis: large, smooth, tense kidney. May be massive.
- Solitary cyst: smooth, non-tender, may be massive.
- Polycystic disease: frequently very large, lobulated, smooth.
- Renal carcinoma: irregular, nodular, often hard, ?fixed.
- Nephroblastoma: large mass in children.

Right suprarenal gland

- Generally: only palpable when large, moves with respiration, difficult to define borders.
- Adenomas: usually cystic if palpable.
- Infections: ?chronic fungal infections, may be tender, systemic features.
- Congenital hyperplasia: young children, endocrine disorders associated, smooth, non-tender.

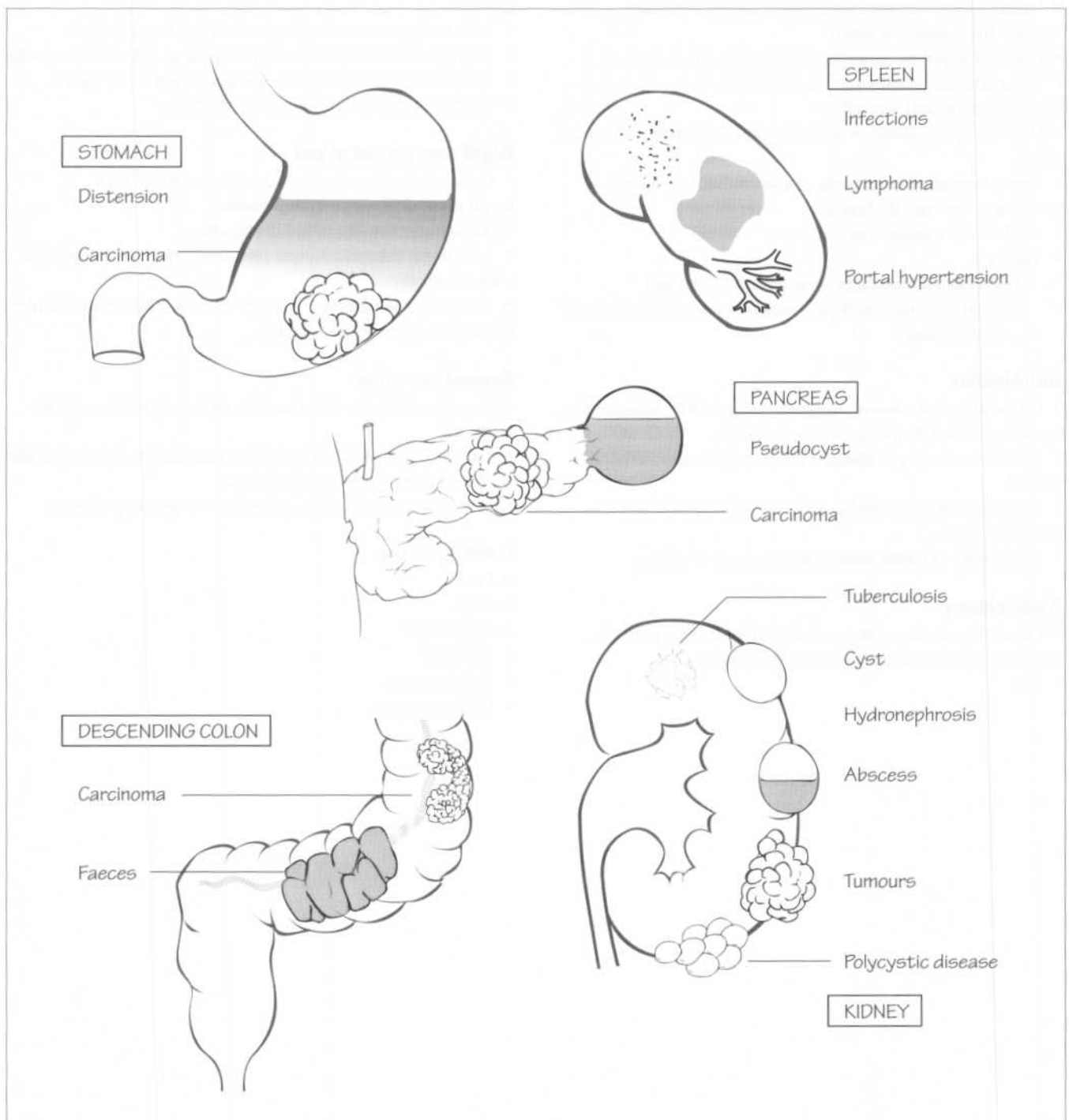
Ascending colon

- Faeces: soft, putty-like mass, mobile, non-tender, can be indented.
- Carcinoma: firm-hard, irregular, non-tender, may be mobile (fixity strongly suggests carcinoma).
- Intussusception: mobile, smooth, sausage-shaped mass.

Investigations

- FBC.
- LFTs.
- Ultrasound.
- CT scan.
- Colonoscopy.
- Barium enema.

11 Abdominal swellings (localized): left hypochondrial swelling



Stomach

- Gastric distension: soft, fluctuant, succussion splash present.
- Neoplasm: irregular, hard, craggy, immobile, does not descend on inspiration.

Spleen

- Generally: moves with respiration, descends towards RIF, dull to percussion, ?notched anterior border, more prominent with patient lying on right side.
- Myeloproliferative disorders/lymphomas/leukaemias/haemolytic anaemias/ITP.
- Portal hypertension: may be very large, smooth, moderately tender.
- Malaria/leishmaniasis: may be massive, history of tropical travel, prone to rupture.

Pancreas

- Generally: does not move with respiration, fixed to retroperitoneum, poorly defined.
- Pseudocyst/cyst: mildly tender (worse if infected), symptoms of gastric obstruction.
- Carcinoma: hard, irregular, non-tender, fixed.

Left kidney

- Generally: moves with respiration, bimanually palpable, resonant to percussion due to overlying bowel.
- TB.
- Perinephric abscess/pyonephrosis: acutely tender, systemic signs, rarely large.

- Hydronephrosis: large, smooth, tense kidney. May be massive.
- Solitary cyst: smooth, non-tender, may be massive.
- Polycystic disease: frequently very large, lobulated, smooth.
- Renal carcinoma: irregular, nodular, often hard, ?fixed.
- Nephroblastoma: large mass in children.

Left suprarenal gland

- Generally: only palpable when large, moves with respiration, difficult to define borders.
- Adenomas: usually cystic if palpable.
- Infections: ?chronic fungal infections, may be tender, systemic features.
- Congenital hyperplasia: young children, endocrine disorders associated, smooth, non-tender.

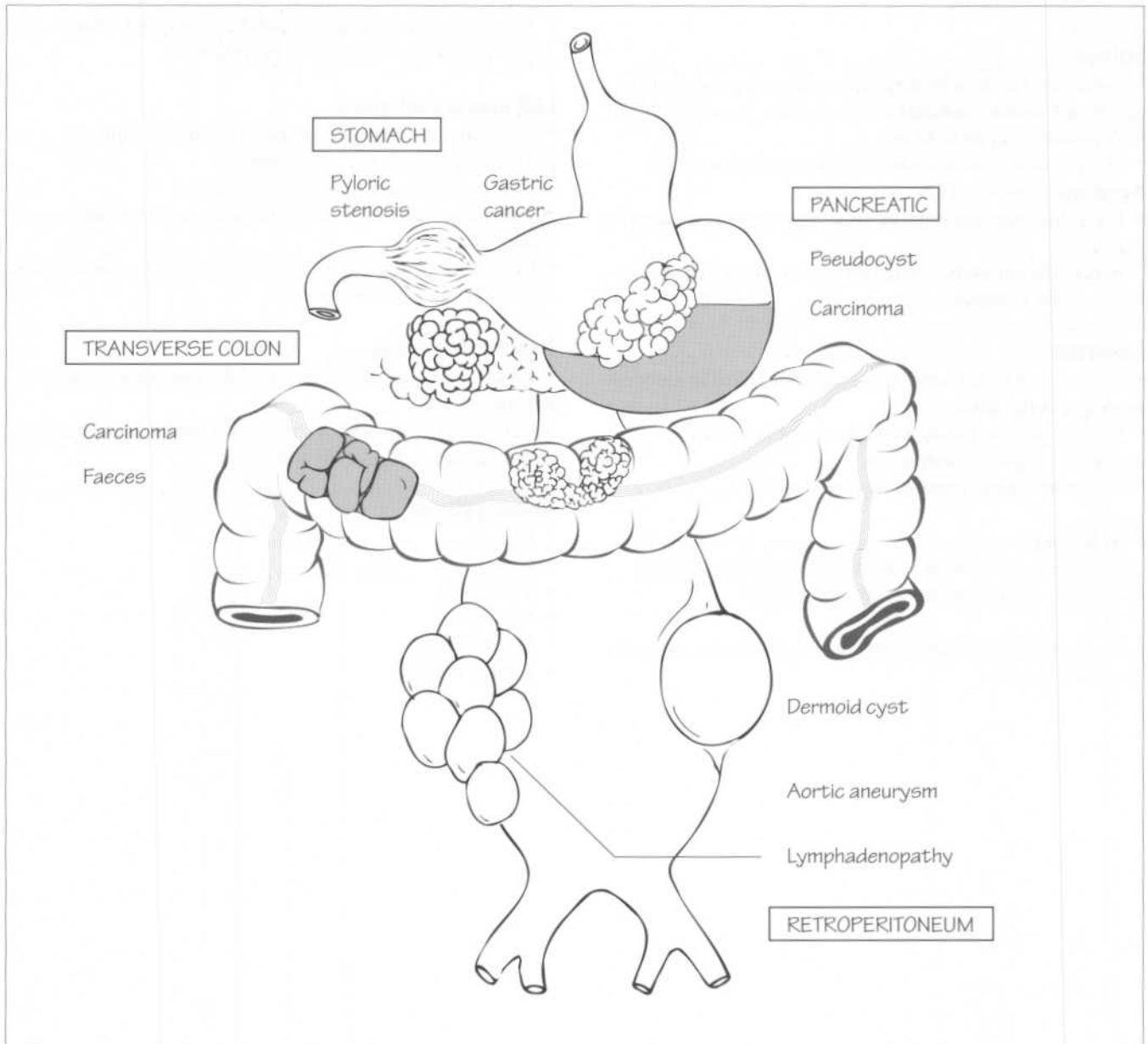
Descending colon

- Faeces: soft, putty-like mass, mobile, non-tender, can be indented.
- Carcinoma: firm-hard, irregular, non-tender, may be mobile (fixity strongly suggests carcinoma).

Investigations

- FBC.
- LFTs.
- Ultrasound.
- CT scan.
- Colonoscopy.
- Barium enema.

12 Abdominal swellings (localized): epigastric swelling



Abdominal wall

- Epigastric hernia: midline, between epigastrium and xiphisternum, usually small, often painful.

Stomach

- Congenital hypertrophic pyloric stenosis: smooth, 'olive'-sized, non-tender, mobile. More prominent after eating, associated with visible peristalsis.
- Carcinoma: irregular, hard, craggy mass, may be fixed.

Pancreas

- Generally: does not move with respiration, fixed to retroperitoneum, poorly defined.
- Pseudocyst/cyst: mildly tender (worse if infected), symptoms of gastric obstruction, ?transmitted aortic pulsations.
- Carcinoma: hard, irregular, non-tender, fixed, associated with back pain/jaundice/recent-onset diabetes mellitus.

Retroperitoneum

- Lymphadenopathy: solid, immobile, irregular, 'rubbery', may be massive particularly if lymphomatous.
- Dermoid cysts (rare): deep seated, smooth, recurrent after surgery.
- Aortic aneurysm: smooth, fusiform, pulsatile, expansile, may be tender.

Transverse colon

- Generally: mobile, does not move with respiration.
- Faeces: soft, putty-like mass, mobile, non-tender, can be indented.
- Carcinoma: firm-hard, irregular, non-tender, may be mobile (fixity strongly suggests carcinoma).

Liver

- Any enlargement of the left lobe of the liver may be felt in the epigastrium.

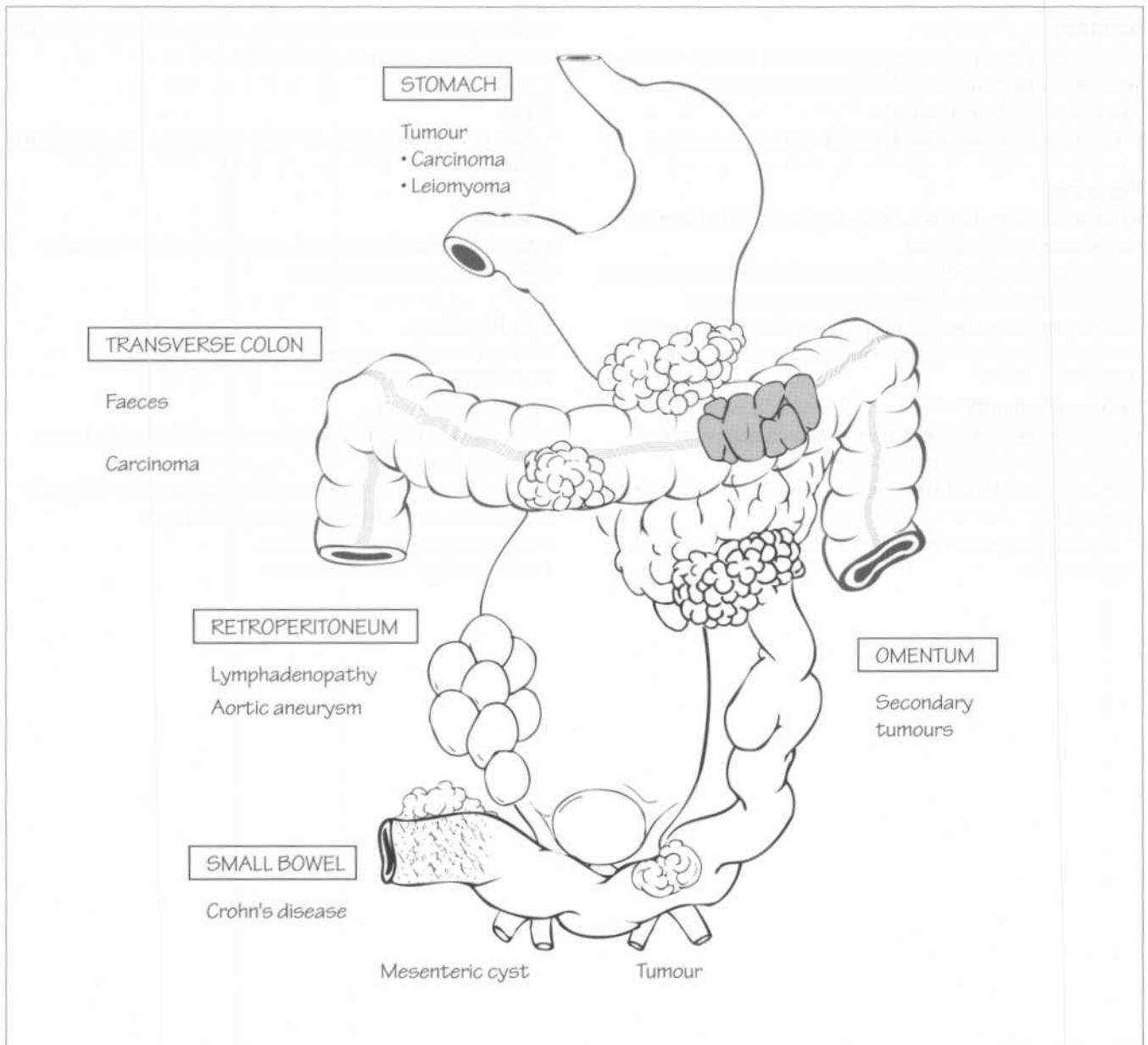
Omentum

- Secondary carcinoma: hard, irregular, mobile, 'pancake like', often ovarian carcinoma.

Investigations

- FBC: anaemia — tumours.
- WCC: lymphomas.
- LFTs: liver lesions.
- Ultrasound: lymphadenopathy, pancreatic (pseudo)cysts, aortic aneurysm.
- CT scan: pancreatic tumours, lymphadenopathy, retroperitoneal cysts, aortic aneurysm, omental deposits.
- Gastroscopy: stomach tumours.
- Colonoscopy: colonic tumours.

13 Abdominal swellings (localized): umbilical swelling



Abdominal wall

- Umbilical hernia: common in infants, usually closes spontaneously.
- Para-umbilical hernia: adult (often female), frequently incarcerates or strangulates.

Retroperitoneum

- Lymphadenopathy: solid, immobile, irregular, 'rubbery', may be massive particularly if lymphomatous.
- Dermoid cysts (rare): deep seated, smooth, recurrent after surgery.
- Aortic aneurysm: smooth, fusiform, pulsatile, expansile, may be tender.

Stomach

- Carcinoma: irregular, hard, craggy mass, may be fixed.

Transverse colon

- Generally: mobile, does not move with respiration.
- Faeces: soft, putty-like mass, mobile, non-tender, can be indented.
- Carcinoma: firm-hard, irregular, non-tender, may be mobile (fixity strongly suggests carcinoma).

Small intestine

- Generally: highly mobile, variable position.
- Neoplasm (rare).
- Crohn's disease: thickened bowel wall may be felt as a mobile smooth mass.
- Mesenteric cysts: well defined, lateral mobility, usually congenital, ?associated pain, nausea and vomiting.

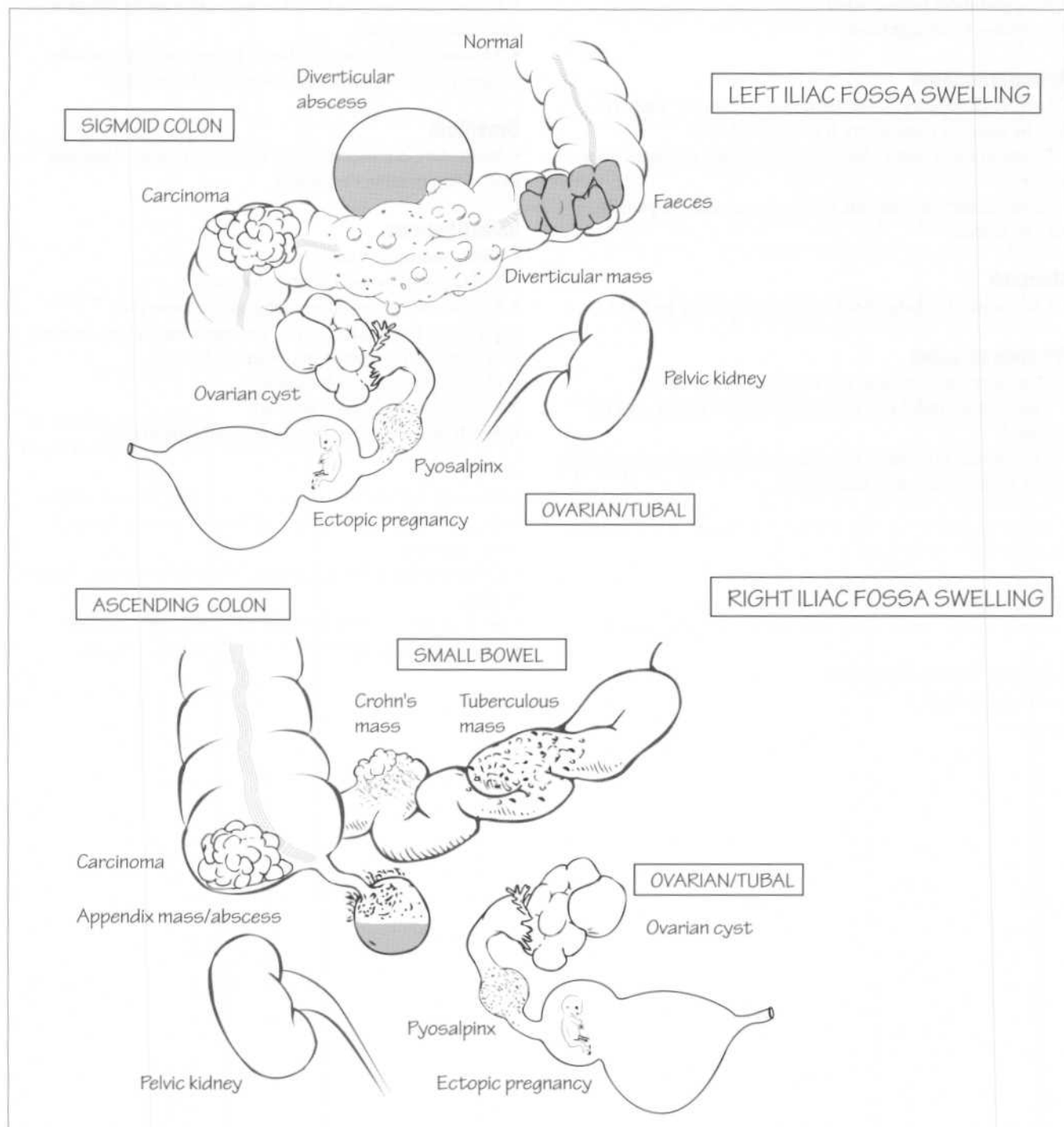
Omentum

- Secondary carcinoma: hard, irregular, mobile, 'pancake like', often ovarian carcinoma.

Investigations

- FBC: anaemia—tumours.
- WCC: lymphomas, Crohn's disease.
- Ultrasound: lymphadenopathy, aortic aneurysm.
- CT scan: lymphadenopathy, retroperitoneal cysts, mesenteric cysts, aortic aneurysm, omental deposits.
- Gastroscopy: stomach tumours.
- Colonoscopy: colonic tumours.
- Small bowel enema: small intestinal tumours.

14 Abdominal swellings (localized): left and right iliac fossae



Left iliac fossa swelling

Abdominal wall

- Inguinal hernia: indirect—controlled by digital pressure wall over internal ring.
- Inguinal hernia: direct—protrudes through Hasselbach's triangle.

Sigmoid colon

- Diverticular mass: tender, ill defined, rubbery hard, non-mobile.
- Paracolic abscess: acutely tender, ill defined, ?fluctuant, systemic upset.
- Carcinoma: hard, craggy, non-tender unless perforated, immobile, associated with altered bowel habit/obstructive symptoms.
- Faeces: firm, indentable/'malleable', mobile with colon.
- Normal: only in a thin person, non-tender, chord like.

Ovary/fallopian tube

- Cyst: may be massive, usually mobile, ?bimanually palpable on PV examination.
- Neoplasm.
- Ectopic pregnancy: very tender, associated with PV bleeding/intra-abdominal bleeding and collapse.
- Salpingo-oophoritis: very tender, bimanually palpable, associated with PV discharge.

Other

- Pelvic kidney: smooth, regular, non-tender, non-mobile.

Right iliac fossa swelling

Abdominal wall

As above.

Terminal ileum

- Crohn's mass: tender, ill defined, rubbery hard, non-mobile.
- Tuberculous mass: mildly tender, ill defined, firm, associated with cutaneous sinuses, ?systemic TB.

Caecum/ascending colon

- Appendix mass/abscess: acutely tender, ill defined, ?fluctuant, systemic upset.
- Carcinoma: hard, craggy, non-tender unless perforated, immobile, associated with anaemia/weight loss and anergia.

Ovary

As above.

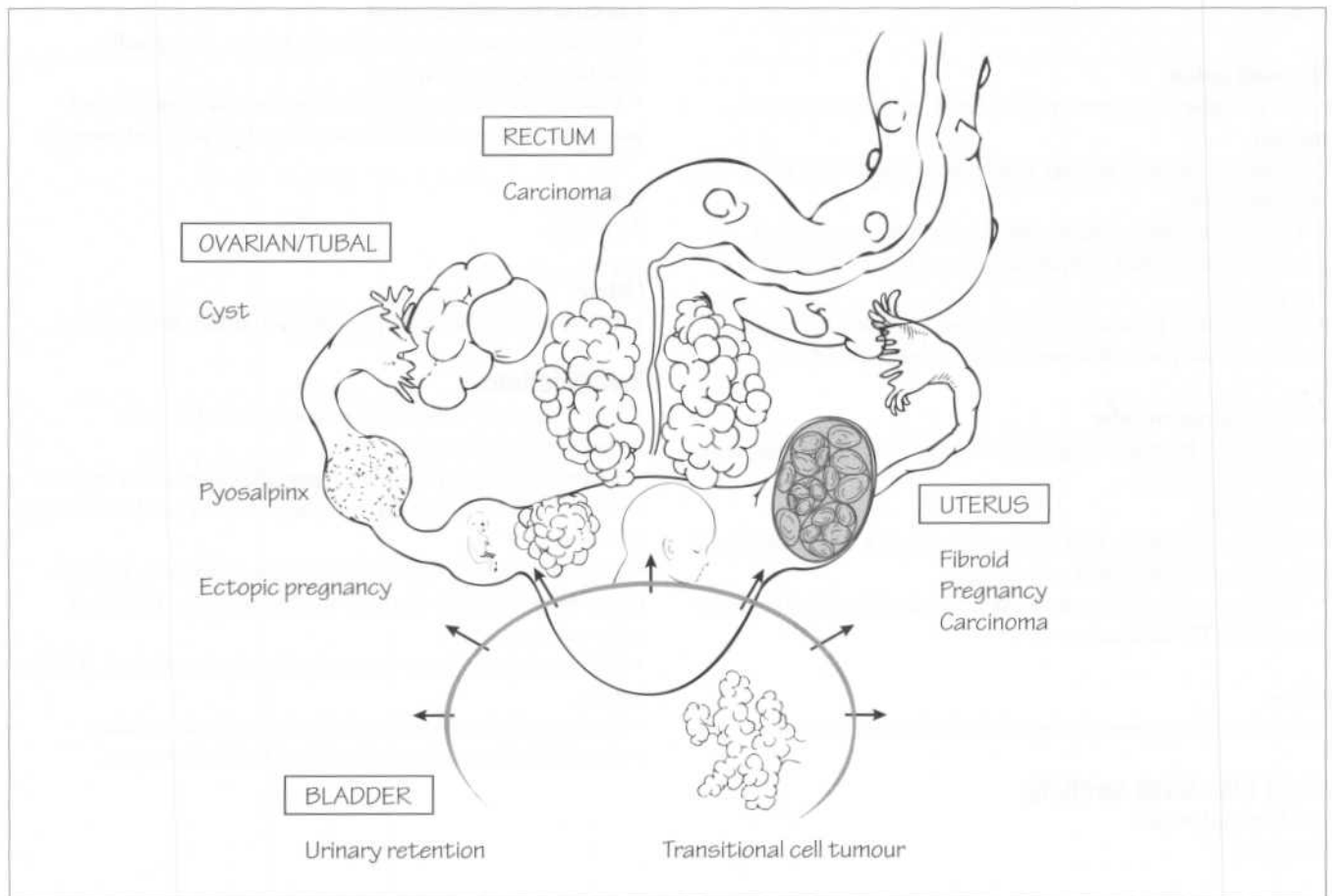
Other

- Pelvic kidney: smooth, regular, non-tender, non-mobile.

Investigations

- FBC: anaemia—tumours; leucocytosis—Crohn's/appendicitis/diverticulitis.
- Ultrasound: ovarian lesions, appendix/diverticular mass or abscess, Crohn's mass, pelvic kidney. Allows guided drainage of abscesses.
- CT scan: appendix/diverticular mass or abscess, Crohn's mass. Allows guided drainage of abscesses and biopsy of some tumours.
- Colonoscopy: colonic tumours, diverticular disease. Allows biopsy.
- Barium enema: diverticular disease, colonic tumours.
- Small bowel enema: terminal ileal Crohn's disease.

15 Abdominal swellings (localized): hypogastric (suprapubic) swelling



Bladder

- Generally: midline swelling, extends up towards umbilicus, dull to percussion, non-mobile, cannot 'get below it'.
- Retention of urine: stony dull to percussion, associated with desire to pass urine, disappears on voiding/catheterization.
- Transitional cell carcinoma: hard, irregular, fixed, may be associated with dysuria, haematuria and desire to pass urine on examination.

Uterus

- Pregnancy: smooth, regular, fetal heart sounds heard/movements!
- Fibromyoma: usually smooth, may be pedunculated and mobile, non-tender, associated menorrhagia.
- Uterine carcinoma: firm uterus, may be tender, irregular only if tumour extrauterine, associated PV bloody discharge.

Ovary/fallopian tube

- Cyst: may be massive, usually mobile, ?bimanually palpable on PV examination.
- Neoplasm.

- Ectopic pregnancy: very tender, associated with PV bleeding/intra-abdominal bleeding and collapse.
- Salpingo-oophoritis: very tender, bimanually palpable, associated with PV discharge/dyspareunia.

Rectum

- Carcinoma: firm, irregular, non-tender, relatively immobile, associated alteration in bowel habit/PR bleeding.

Urachus (rare)

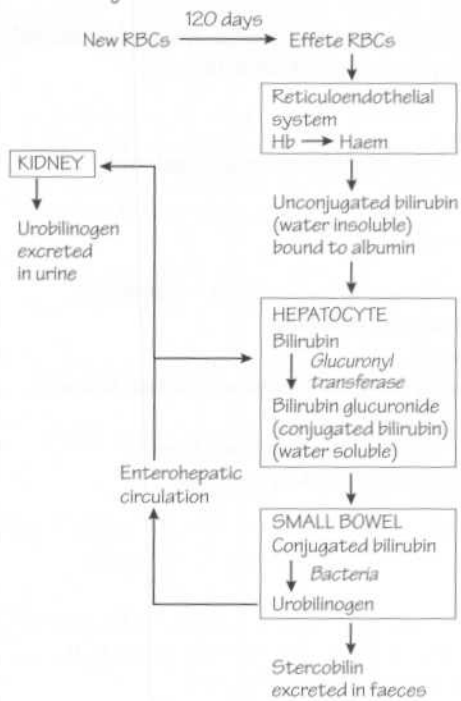
- Cyst: small swelling in midline, ?associated umbilical discharge.

Investigations

- FBC: anaemia — tumours; leucocytosis — salpingitis.
- MSU: infected urinary retention.
- β -HCG: pregnancy.
- Ultrasound: ovarian lesions, pregnancy, uterine lesions, bladder tumours.
- Sigmoidoscopy: rectal tumours. Allows biopsy.
- CT scan: ovarian lesions, bladder tumours.

16 Jaundice

Anatomy and normal bilirubin metabolism



Biochemical features of different types of jaundice

Type of jaundice	Haemolytic	Hepatocellular		Obstructive
		Early	Late	
Serum bilirubin				
Unconjugated	↑	N / ↑	N / ↑	N
Conjugated	N	N	↑	↑↑
Urinary bilirubin	N / ↑	↑	↑	↑↑
Urobilinogen	N / ↑	N	↓	↓↓
LFTs				
Alkaline phosphatase	N	N	↑	↑↑
γ-GT transaminase	N	↑	↑	↑↑
Transaminases	N	↑	↑↑	N / ↑
Lactate dehydrogenase	N	↑	↑↑	N / ↑
FBC				
Reticulocytes	> 2%	N	N	N

CAUSES OF OBSTRUCTIVE JAUNDICE

MURAL / INTRINSIC

Liver cell transport abnormalities
 Sclerosing cholangitis
 Cholangiocarcinoma
 Mirizzi syndrome
 Benign stricture

- Postinflammatory
- Postoperative
- Postradiotherapy

INTRALUMINAL

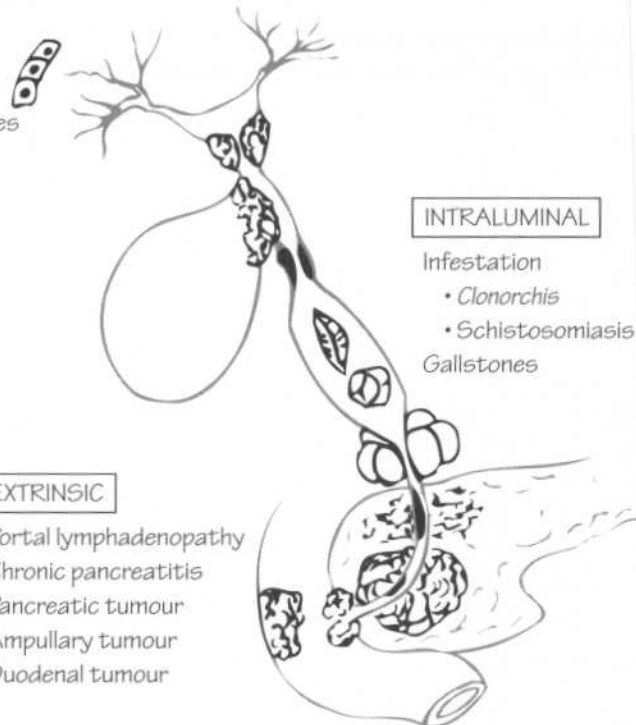
Infestation

- Clonorchis
- Schistosomiasis

 Gallstones

EXTRINSIC

Portal lymphadenopathy
 Chronic pancreatitis
 Pancreatic tumour
 Ampullary tumour
 Duodenal tumour



Definitions

Jaundice (also called icterus) is defined as yellowing of the skin and sclera from accumulation of the pigment bilirubin in the blood and tissues. The bilirubin level has to exceed 35–40 mmol/l before jaundice is clinically apparent.

Key points

- Jaundice can be classified simply as pre-hepatic, hepatic and post-hepatic.
- Most of the surgically treatable causes of jaundice are post-hepatic.

Differential diagnosis

The following list explains the mechanisms behind the causes of jaundice.

Pre-hepatic jaundice

Haemolytic/congenital hyperbilirubinaemias

- Excess production of unconjugated bilirubin exhausts the capacity of the liver to conjugate the extra load, e.g. haemolytic anaemias (e.g. hereditary spherocytosis, sickle cell disease, hypersplenism, thalassaemia).

Hepatic/hepatocellular jaundice

Hepatic unconjugated hyperbilirubinaemia

- Failure of transport of unconjugated bilirubin into the cell, e.g. Gilbert's syndrome.
- Failure of glucuronyl transferase activity, e.g. Criglar–Najjar syndrome.

Hepatic conjugated hyperbilirubinaemia

- Hepatocellular injury. Hepatocyte injury results in failure of

excretion of bilirubin, e.g. infections: viral hepatitis; poisons: CCl₄, aflatoxin; drugs: paracetamol, halothane.

Post-hepatic/obstructive jaundice

Post-hepatic conjugated hyperbilirubinaemia

- Anything that blocks the release of conjugated bilirubin from the hepatocyte or prevents its delivery to the duodenum.

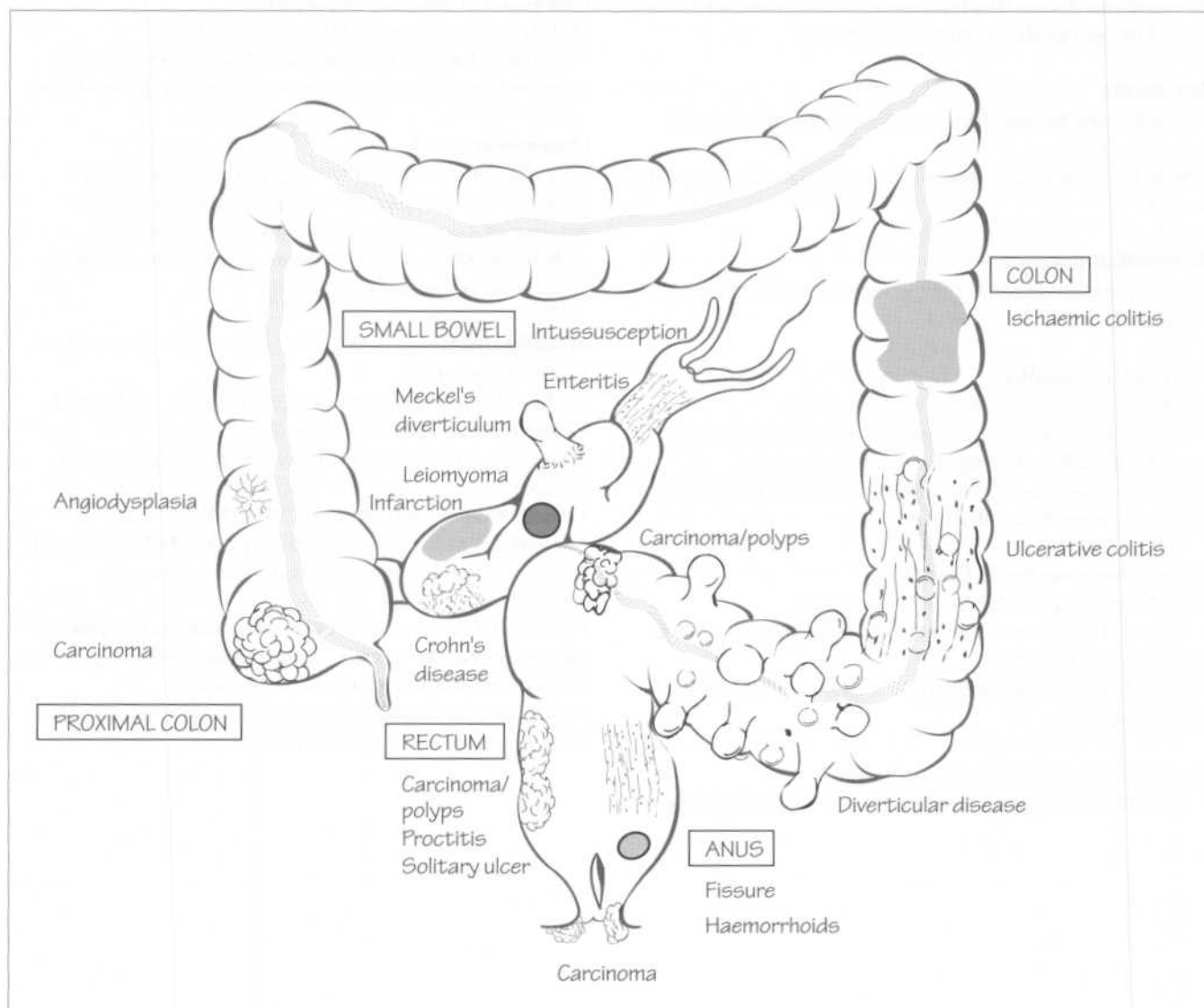
Courvoisier's law

- 'A palpable gallbladder in the presence of jaundice is unlikely to be due to gallstones.' It usually indicates the presence of a neoplastic stricture (tumour of pancreas, ampulla, duodenum, CBD), chronic pancreatitic stricture or portal lymphadenopathy.

Investigations

- FBC: haemolysis.
- LFTs: ↑ alkaline phosphatase (cholestasis), ↑ γ-GT and transaminases (hepatocellular).
- Clotting: PT (elevated in cholestatic and hepatocellular jaundice).
- Viral titres: hepatitis A, B, C, CMV, EBV.
- Ultrasound: dilatation of the biliary tree (cholestasis), gallstones (gallbladder and bile ducts), details of hepatic parenchyma.
- ERCP: bile duct strictures (tumours, pancreatitis, inflammatory), gallstones. Allows diagnostic biopsy/cytology. Allows therapeutic stenting, stone removal.
- PTC: similar to ERCP (useful where ERCP has failed).
- Liver biopsy: hepatocellular disease.

17 Rectal bleeding



Definition

Rectal bleeding is the passage of blood, usually bright red or fresh.

Key points

- Bright red rectal bleeding usually comes from a lesion distal to the terminal ileum, but may arise from the upper GI tract.
- Clots mixed with the blood suggest bleeding from the sigmoid colon or more proximally.
- In children, Meckel's diverticulum, intussusception and ileal tumours are common causes.

- In young adults, colitis, Meckel's diverticulum and haemorrhoids are common causes.
- In the elderly, neoplasia, diverticular disease and angiodysplasia are common causes.

Differential diagnosis

The sources, causes and features are listed below.

Small intestine

- Meckel's diverticulum: young adults, painless bleeding, darker red/melaena common.

- Intussusception: young children, colicky abdominal pain, retching, bright red/mucus stool.
- Enteritis (infective/radiation/Crohn's).
- Ischaemic: severe abdominal pain, physical examination shows mesenteric ischaemia or AF, few signs, later collapse and shock.
- Tumours (leiomyoma/lymphoma): rare, intermittent history, often modest volumes lost.

Proximal colon

- Angiodysplasia: common in the elderly, painless, no warning, often large volume, fresh and clots mixed.
- Carcinoma of the caecum: more often causes anaemia than PR bleeding.

Colon

- Polyps/carcinoma: may be large volume or small, ?associated change in bowel habit, blood often mixed with stool.
- Diverticular disease: spontaneous onset, painless, large volume, mostly fresh blood, physical examination of constipation.
- Ulcerative colitis: blood mixed with mucus, associated with systemic upset, long history, intermittent course, diarrhoea prominent.
- Ischaemic colitis: elderly, severe abdominal pain, AF, bloody diarrhoea, collapse and shock later.

Rectum

- Carcinoma of the rectum: change in bowel habit common, rarely large volumes.
- Proctitis: bloody mucus, purulent diarrhoea in infected, perianal irritation common.

- Solitary rectal ulcer: bleeding post-defaecation, small volumes, feeling of 'lump in anus', mucus discharge PR.

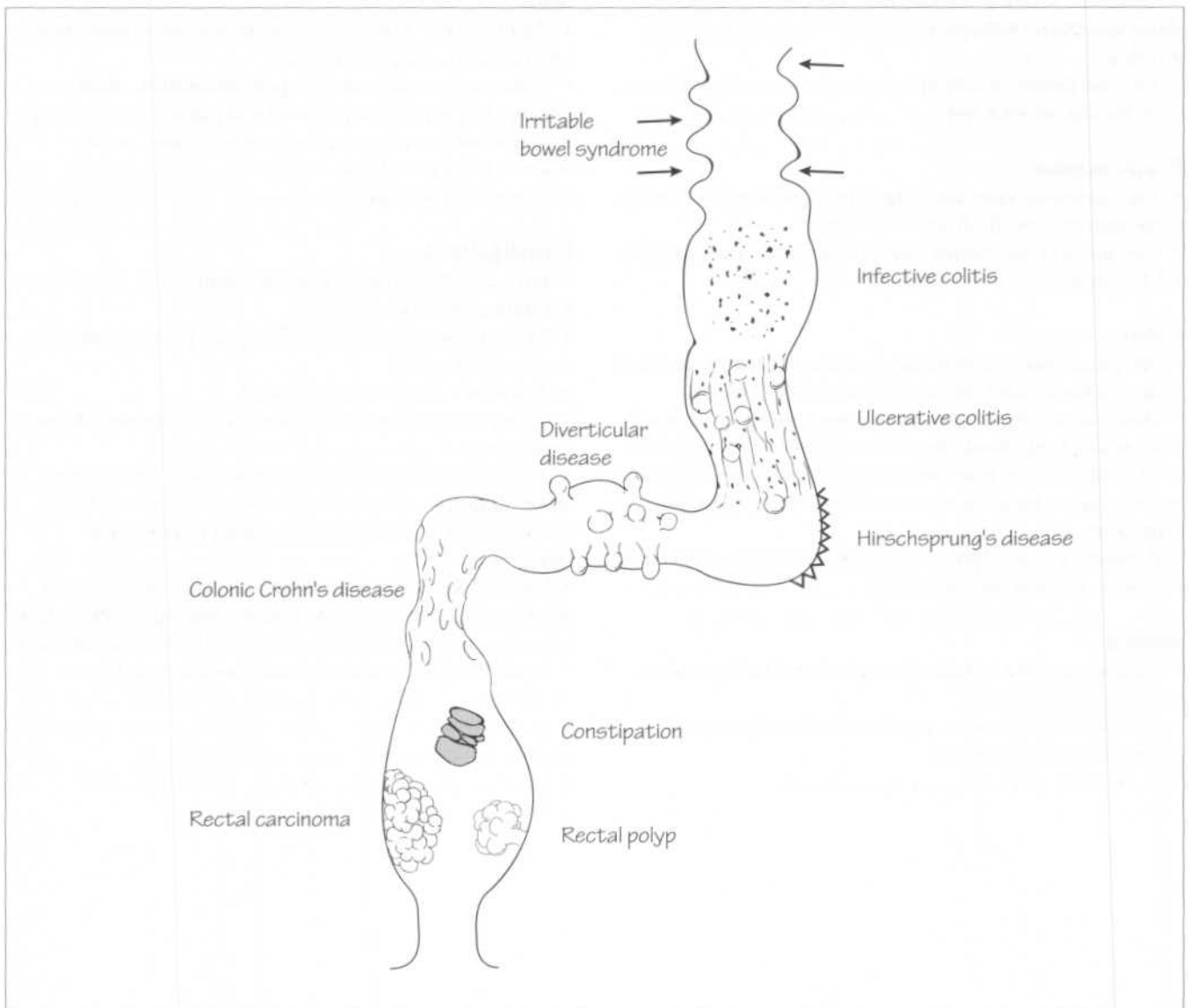
Anus

- Haemorrhoids: bright red bleeding post-defaecation, stops spontaneously, perianal irritation.
- Fissure *in ano*: extreme pain post-defaecation, small volumes bright red blood on stool and paper.
- Carcinoma of the anus: elderly, mass in anus, small volumes bloody discharge.
- Perianal Crohn's disease.

Investigations

- FBC: anaemia—tumours/chronic colitis.
- Clotting: bleeding diatheses.
- PR/sigmoidoscopy: anorectal tumours, prolapse, haemorrhoids, distal colitis.
- Abdominal X-ray: intussusception.
- Colonoscopy: diverticular disease, colon tumours, angiodysplasia.
- Angiography: angiodysplasia, small bowel causes (especially Meckel's). (Needs active bleeding 0.5 ml/min, highly accurate when positive, invasive, allows embolization therapy.)
- Labelled RBC scan: angiodysplasia, small bowel causes, obscure colonic causes. (Needs active bleeding 1ml/min, less accurate placement of source, non-invasive, non-therapeutic.)
- Small bowel barium meal: small bowel tumours.

18 Altered bowel habit



Definitions

'Normal' bowel habit varies widely from person to person. Alterations in bowel habit are common manifestations of GI disease. *Constipation* is defined as infrequent or difficult evacuation of faeces and can be acute or chronic. *Absolute constipation* is defined as the inability to pass either faeces or flatus. *Diarrhoea* is an increase in the volume, frequency or fluidity of stool.

Key points

- Acute constipation often indicates intestinal obstruction. The cardinal features of obstruction are colicky abdominal pain, vomiting and constipation.
- Chronic constipation may be a lifelong problem or may develop slowly in later life.
- Acute diarrhoea is usually infective or due to the endotoxins of food poisoning.

- All alterations in bowel habit that persist *must* be investigated for an underlying cause—colorectal neoplasms are common causes especially in the elderly.

Differential diagnosis

Chronic constipation

Bowel disease

- Colon cancer: gradual onset, colicky abdominal pain, associated weight loss, anergia, anaemia, positive faecal occult bloods, abdominal mass.
- Diverticular disease: associated LIF pains, inflammatory episodes, rectal bleeding.
- Perianal pain, e.g. fissure, perianal abscess—due to spasm of the internal anal sphincter, common in children.

Adynamic bowel

- Hirschsprung's disease: constipation from birth, gross abdominal distension.
- Drugs: opiates, anticholinergics, antipsychotics, secondary to chronic laxative abuse.

Acute diarrhoea

Infections

- *Salmonella*: associated colicky abdominal pain, vomiting.
- Dysentery: blood and mucus in motions, ulcers in rectum and *Entamoeba histolytica* in the stool, fever, sweating, tachycardia.
- Cholera: severe diarrhoea, 'rice water stool', dehydration, history of foreign travel.

Antibiotics

- Short-lived, self-limiting, mild colicky pain.

Chronic diarrhoea

Bowel disease

- Ulcerative colitis: intermittent, blood and mucus, colicky pains, young adults.
- Crohn's disease: diarrhoea, pain prominent, blood and mucus less common, young adults.
- Colon cancer: older, occasional blood streaks and mucus, change in frequency may be the only feature, positive faecal occult blood, ?palpable PR.
- Irritable bowel syndrome: diarrhoea and constipation mixed, bloating, colicky pain, small stool pellets, never blood.
- Spurious: impacted faeces in rectum, liquefied stool passes around faecal obstruction.
- Polyps (villous) (rare): watery, mucoid diarrhoea, K⁺ loss, commonest in rectum.
- Diverticular disease (rare): see above.

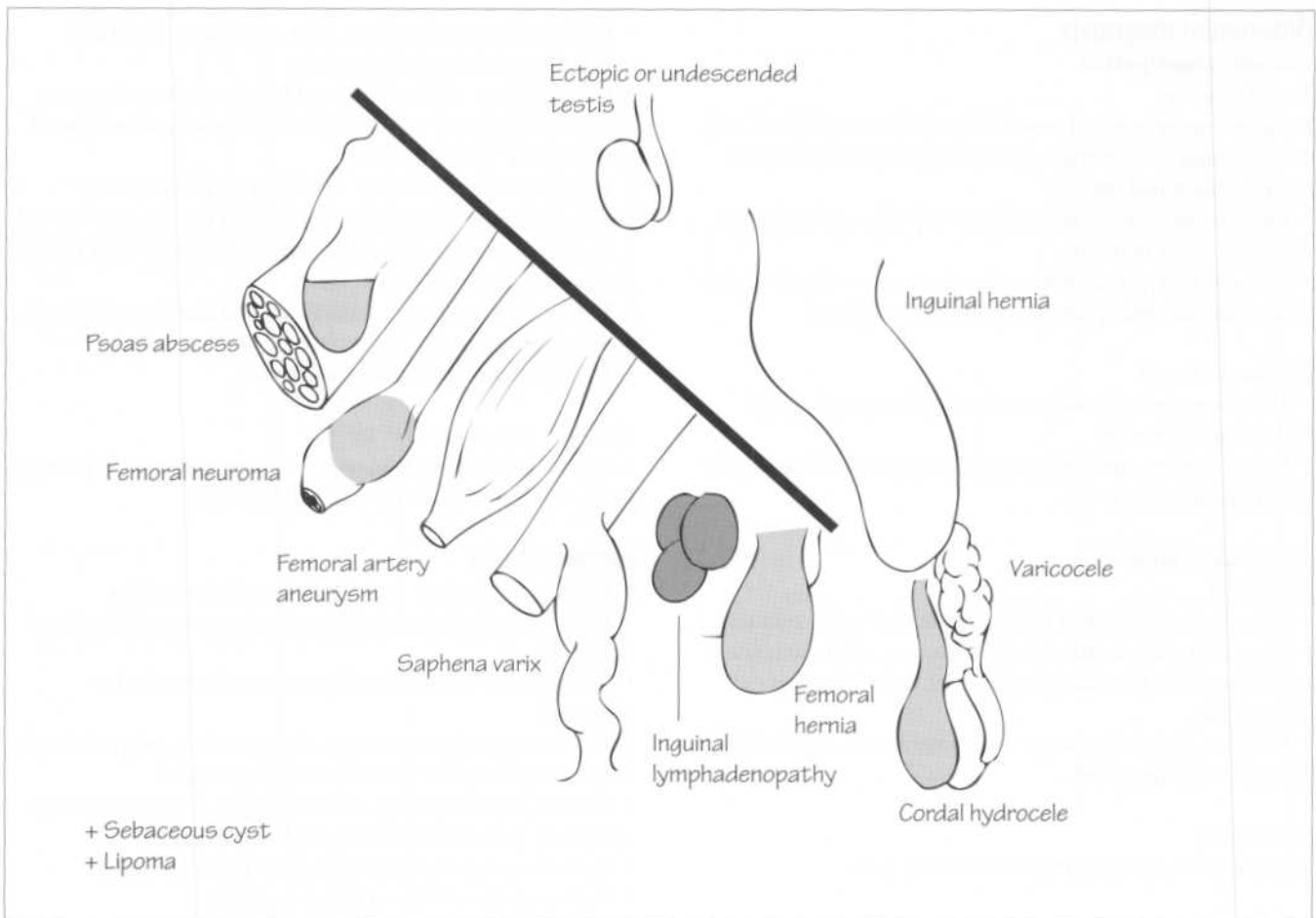
Systemic disease

- Thyrotoxicosis, anxiety, peptides from tumours (VIP, serotonin, substance P, calcitonin), laxative abuse.

Investigations

- Rectal examination: rectal cancer, rectal adenoma.
- FBC: anaemia from colon cancer, ulcerative colitis, diverticular disease.
- Stool culture: infections (remember microscopy for parasites).
- Proctoscopy/sigmoidoscopy: cancer, colitis, polyps (simple, easy, cheap and safe; performed in outpatients).
- Flexible sigmoidoscopy: cancer, polyps, colitis, infections (relatively safe, well tolerated, high sensitivity).
- Barium enema: best for tumours of proximal colon.
- Colonoscopy: colitis (extent and severity).

19 Inguinal swellings



Definition

Any swelling in the inguinal area.

Key points

- Inguinal hernias are common and lie above and medial to the pubic tubercle.
- Femoral hernias are commoner in women and lie below and lateral to the pubic tubercle.
- Femoral hernias are high risk and need urgent attention.
- Inguinal lymphadenopathy may be isolated or part of systemic lymphadenopathy. A cause should always be sought.

Differential diagnosis

The types, causes and features are listed below.

Inguinal

- Direct inguinal hernia: not controlled by pressure over internal ring, characteristically causes a 'forward' bulge in the groin, does not descend into the scrotum.
- Indirect inguinal hernia: controlled by pressure over internal ring, 'slides' through the inguinal canal, often descends into the scrotum.
- Undescended testis: often mass at the external ring or inguinal canal, associated with hypoplastic hemi-scrotum, frequently associated with indirect inguinal hernia.
- Spermatic cord: 'cordal' hydrocele, does not have a cough impulse, may be possible to define upper edge, fluctuates and transilluminates.
- Lipoma: soft, fleshy, does not transilluminate or fluctuate.

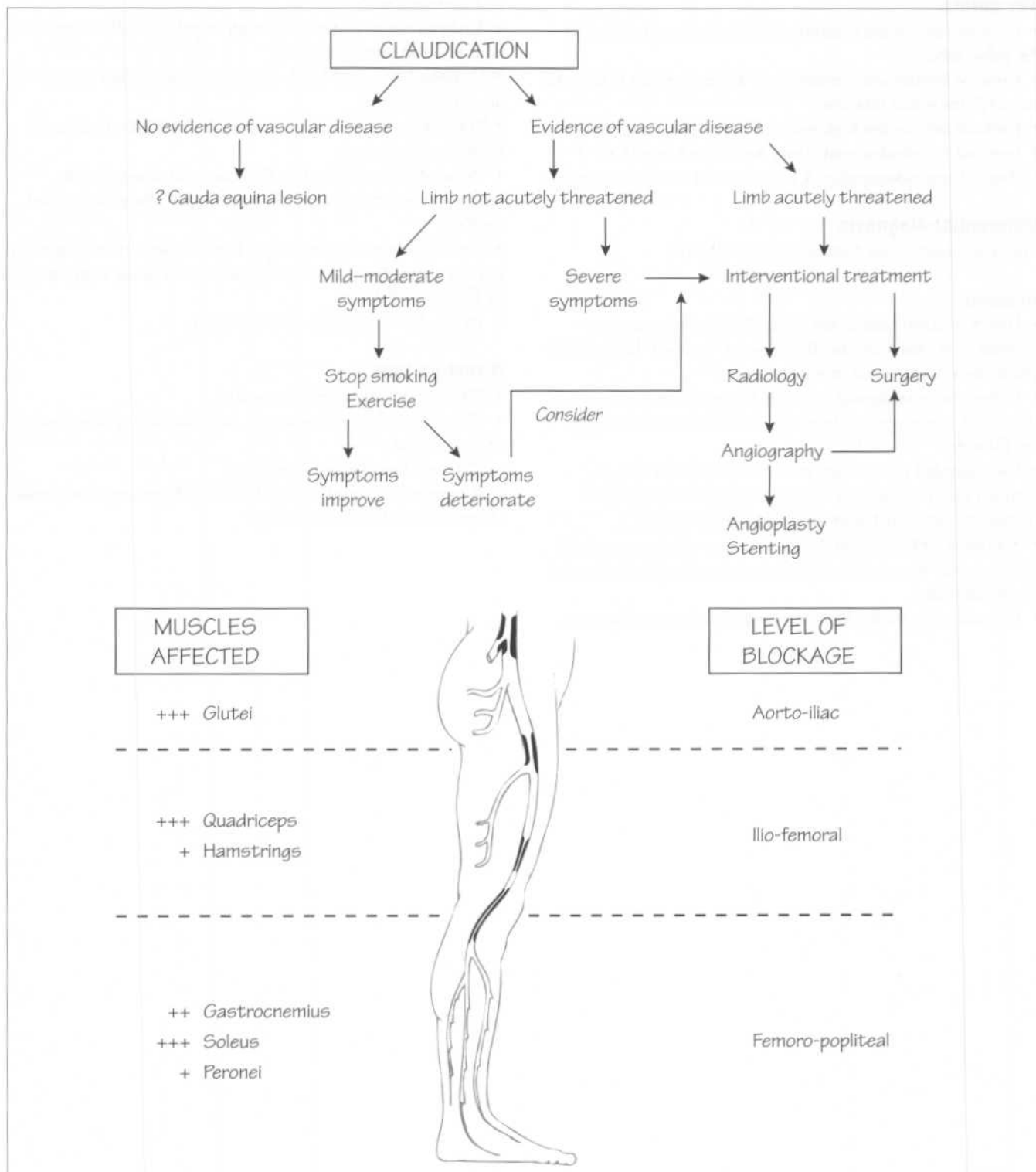
Femoral

- Femoral hernia: elderly women, may be tender and non-expansile, groin crease often lost, high risk of strangulation and obstruction.
- Saphena varix: expansile, cough impulse, thrill on percussion of distal saphenous vein.
- Lymphadenopathy: hard, discrete nodules, often multiple or an indistinct mass.
- Femoral artery aneurysm: expansile, pulsatile, thrill and bruit may be present.
- Psoas abscess (rare): soft, fluctuant and compressible, lateral to the femoral artery, may be 'cold' abscesses caused by TB.
- Femoral neuroma (very rare): hard, smooth, moves laterally but not vertically, pressure may cause pain in the distribution of the femoral nerve.
- Hydrocele of femoral sac (very rare).

Investigations

- FBC: causes of lymphadenopathy.
- Ultrasound: femoral aneurysm, saphena varix, psoas abscess, ectopic testicle.
- CT scan: cause of psoas abscess.
- Herniography: rarely needed to confirm presence of hernia if operative indication not clear.

20 Claudication



Definition

Intermittent claudication is defined as an aching pain in the leg muscles, usually the calf, which is precipitated by walking and is relieved by rest.

Key points

- Claudication pain is always reversible and relieved by rest.
- Claudication tends to improve with time and exercise due to the opening up of new collateral supply vessels.
- The site of disease is one level higher than the highest level of affected muscles.
- Most patients with claudication have associated vascular disease (coronary or cerebrovascular).
- Cauda equina claudication is extremely rare.
- Cauda equina ischaemia caused by osteoarthritis of the spine can also cause intermittent claudication. Osteophytes narrow the spinal canal (spinal stenosis) producing pressure on the cauda equina. Exercise reduces blood flow to the pelvis and spine and creates ischaemia which causes pain in the distribution of the sacral nerve roots.

Differential diagnosis

Vascular

Atheroma

Typical patient: male, over 45, ischaemic heart disease, smoker, diabetic, overweight.

- Aortic occlusion: buttock, thigh and possibly calf claudication, impotence in males, absent femoral pulses and below in both legs (Leriche's syndrome).
- Iliac or common femoral stenosis: thigh and calf claudication, absent/weak femoral pulses in affected limb.
- Femoro-popliteal stenosis: calf claudication only, absent popliteal and distal pulses.

Neurological

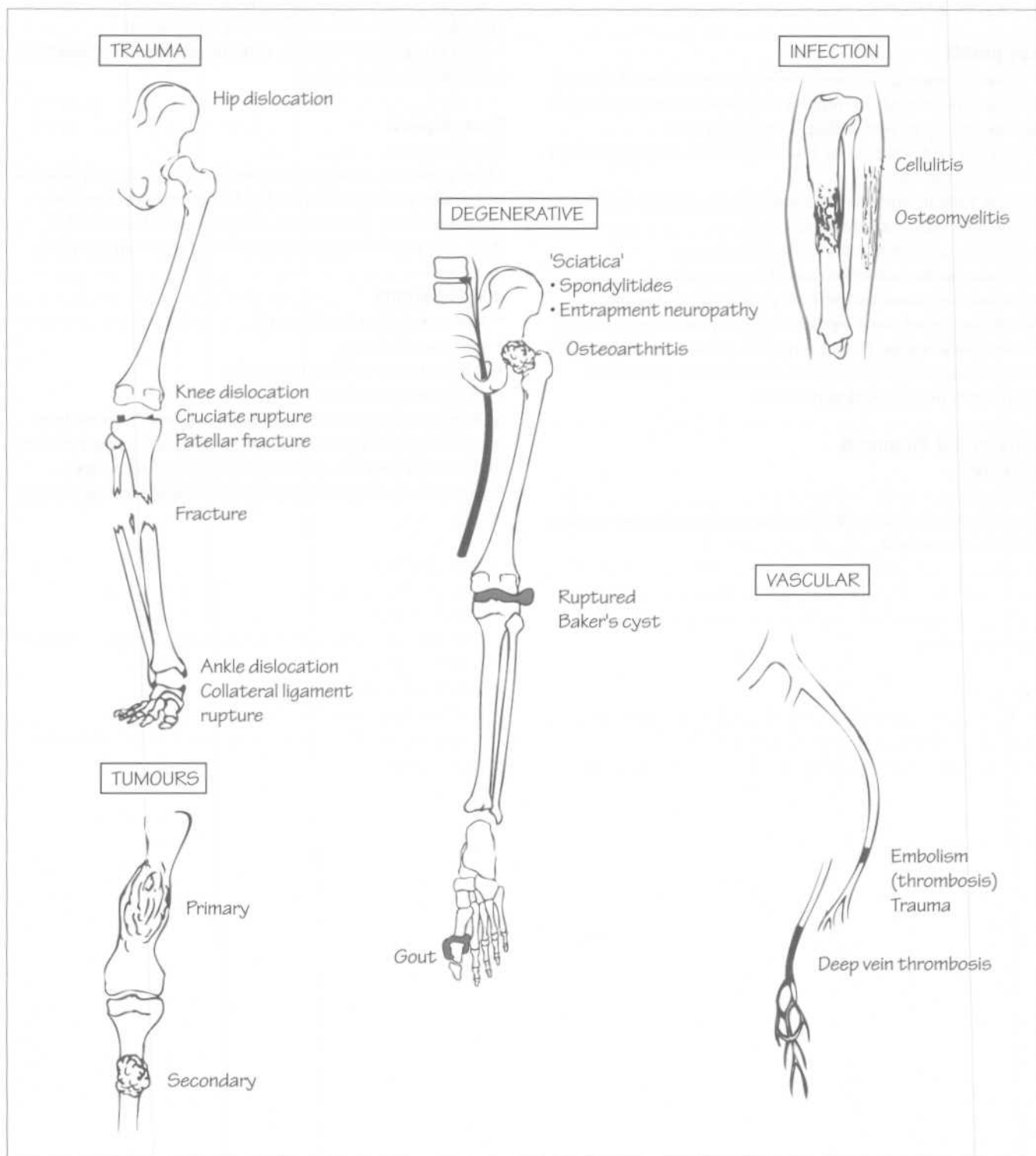
Cauda equina

Elderly patients, history of chronic back pain, pain is bilateral and in the distribution of the S1–S3 dermatomes, may be accompanied by paraesthesia in the feet and loss of ankle jerks, all peripheral pulses palpable and legs well perfused.

Investigations

- FBC: exclude polycythaemia.
- Glucose: diabetes.
- ABI: estimate of disease severity.
- ECG: coronary disease.
- Angiography: precise location and extent of disease, pre-procedure planning. Intravenous — easier, safer, larger volume of dye. Intra-arterial — lower dye volume, better images, higher risk of complications. Digital subtraction — best images of all.

21 Acute leg pain



Definitions

Acute leg pain is a subjective, unpleasant sensation felt somewhere in the lower limb. *Referred pain* is the perception of pain in an area remote from the site of origin of the pain, e.g. leg pain from lumbar disc herniation, knee pain from hip pathology. *Cramps* are involuntary, painful contractions of voluntary muscles. *Sciatica* is a nerve pain caused by irritation of the sciatic nerve roots characterized by lumbosacral pain radiating down the back of the thigh, lateral side of the calf and into the foot.

Key points

- May be due to pathology arising in any of the tissues of the leg.
- Constant or lasting pain suggests local pathology.
- Transient or intermittent pain suggests referred pathology.
- Systemic symptoms or upset suggests inflammation.
- Arterial occlusion needs early identification and treatment.

Differential diagnosis

The causes, sources and features are listed below.

Infection

- Infection of skin (cellulitis): painful, swollen, red, hot leg, associated systemic features—pyrexia, rigors, anorexia, commonly caused by *Streptococcus pyogenes*.
- Acute osteomyelitis: staphylococcal infection, effects metaphyses, acute pain, tenderness and oedema over the end of a long bone, common in children, may be history of skin infection or trauma.

Trauma

- Muscle: muscle swollen, tender and painful, pain worse on attempted movement of the affected muscle.
- Bone: bone painful, tender. Swelling, deformity, discolora-

tion, bruising and crepitus suggest fracture.

- Joints: painful, limited movement, deformity if dislocated, locking and instability with knee injury.

Degenerative

- Gout: first MTP joint (big toe), males, associated signs of joint inflammation.
- Disc herniation (sciatica): pain in distribution of one or two nerve roots, sudden onset, back pain and stiffness, lumbar scoliosis due to muscle spasm.
- Ruptured Baker's cyst: pain mostly behind knee, physical examination of knee arthritis, calf may be hot and swollen.

Tumours

- Bone: deep pain, worse in morning and after exercise, overlying muscle tenderness, pathological fractures, primary (e.g. osteosarcoma, osteoclastoma) or secondary (e.g. breast, prostate, lung metastasis).

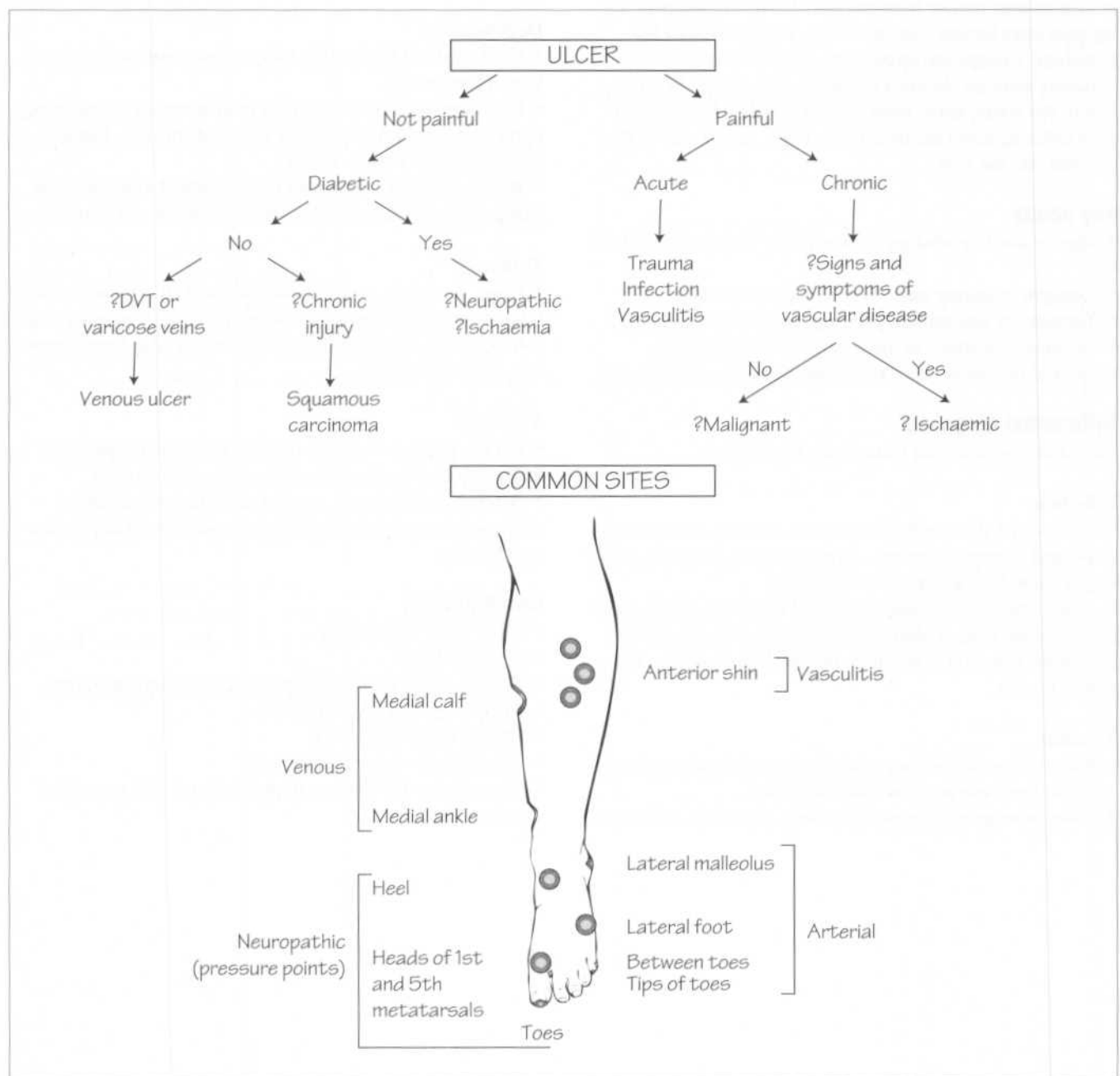
Vascular

- DVT: calf pain, swelling, redness, prominent superficial veins, tender on calf compression, low-grade pyrexia.
- Arterial embolus: pale, painful, pulseless, paraesthetic, paralysed, 'perishingly' cold limb. Possible atrial fibrillation or atheroma.

Investigations

- FBC: WCC in infection.
- Clotting: DVT.
- Plain X-ray: trauma, osteomyelitis, bone tumours, gout.
- MRI: suspected disc herniation.
- Duplex ultrasound: DVT.
- Angiography: arterial embolism.
- Venography: DVT where duplex not available or precise extent needed.

22 Leg ulceration



Definition

An *ulcer* is defined as an area of discontinuity of the surface epithelium.

Key points

- Pain suggests ischaemia or infection.
- Neuropathic ulcers occur over points of pressure and trauma.
- Marked worsening of a chronic ulcer suggests malignant change.
- The underlying cause must be treated first or the ulcer will not heal.
- Underlying varicose veins must be treated for venous ulcers.

Differential diagnosis

The causes and features are listed below.

Venous ulcers

- Venous hypertension secondary to DVT or varicose veins: ulceration on the medial side of the leg, above the ankle, any size, shallow with sloping edges, bleeds after minor trauma, weeps readily, associated dermatoliposclerosis.

Arterial ulcers

- Occlusive arterial disease: painful ulcers, do not bleed, non-healing, lateral ankle, heel, metatarsal heads, tips of the toes, associated features of ischaemia, e.g. claudication, absent pulses, pallor. Elderly patients may present with 'blue toe' syndrome.

Diabetic ulcers

- Ischaemic: same as arterial ulcers.
- Neuropathic: deep, painless ulcers, plantar aspect of foot or toes, associated with cellulitis and deep tissue abscesses, warm foot, pulses may be present.

Malignant ulcers

- Squamous cell carcinoma: may arise *de novo* or malignant change in a chronic ulcer or burn (Marjolin's ulcer). Large ulcer, heaped up, everted edges. Lymphadenopathy—highly suspicious.
- Basal cell carcinoma: uncommon on the leg, rolled edges, pearly white.
- Malignant melanoma: lower limb is a common site, consider malignant if increase in size or pigmentation, bleeding, itching or ulceration.

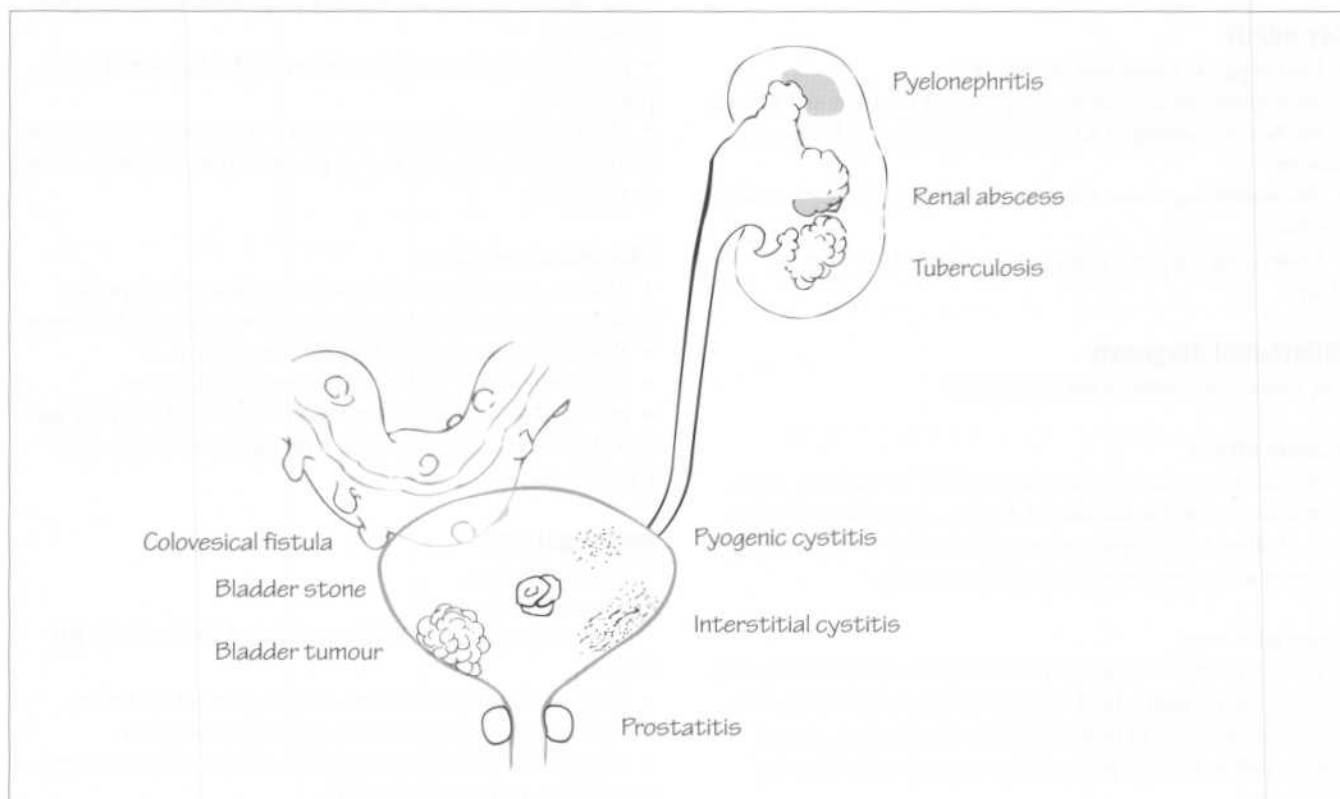
Miscellaneous ulcers

- Trauma: may be caused by minor trauma. Predisposing factors are poor circulation, malnutrition or steroid treatment.
- Vasculitis (rare), e.g. rheumatoid arthritis, SLE.
- Infections (rare): syphilis, TB, tropical infections.
- Pyoderma gangrenosum: multiple necrotic ulcers over the legs that start as nodules. Seen with ulcerative colitis and Crohn's disease.

Investigations

- FBC: infections.
- Glucose: diabetes.
- Special blood tests: TPHA (syphilis), ANCA (SLE), Rh factor.
- Doppler ultrasound: venous disease, arterial occlusion. Simple, cheap, highly sensitive, good screening test.
- Biopsy: malignancy. Melanoma—always excision biopsy. Others may be incision/'punch'.
- Venography/angiography: extent and severity of disease. Planning treatment.

23 Dysuria



Definitions

Dysuria is defined as a pain that arises from an irritation of the urethra and is felt during micturition. *Frequency* indicates increased passage of urine during the daytime, while *nocturia* indicates increased passage of urine during the night. *Urgency* is an uncontrollable desire to micturate and may be associated with incontinence.

Key points

- UTI is the commonest cause in adults.
- Systemic upset suggests ascending UTI (pyelonephritis).
- Elderly men often have an underlying problem of bladder emptying due to prostate disease.
- Recurrent infections require investigation to exclude an underlying cause.

Differential diagnosis

Urinary tract infection

Acute pyelonephritis

Cause

- Upper tract infection.

Predisposing causes

- Obstruction.
- Reflux.
- Calculi.
- Diabetes.
- Neurogenic bladder.

Features

Pyrexia, rigors, flank pain, dysuria, malaise, anorexia, leucocytosis, pyuria, bacteriuria, microscopic haematuria, C & S > 100 000 organisms per ml.

Acute cystitis

Cause

- Lower tract infection.
- Usually coliform bacteria.
- Because of short urethra commoner in females.
- *Proteus* may indicate stone disease.

Features

Dysuria, frequency, urgency, suprapubic pain, low back pain, incontinence and microscopic haematuria.

Urethritis

Cause

- Sexually transmitted diseases.
- May be gonococcal, chlamydial or mycoplasmal.

Features

Dysuria and meatal pruritus, occurs 3–10 days after sexual contact, yellowish purulent urethral discharge suggests *Gonococcus*, thin mucoid discharge suggests *Chlamydia*.

Other causes

Urethral syndrome

A condition characterized by frequency, urgency and dysuria in women with urine cultures showing no growth or low bacterial counts.

Vaginitis

Condition characterized by dysuria, pruritus and vaginal

discharge. Urine cultures are negative, but vaginal cultures often reveal *Trichomonas vaginalis*, *Candida albicans* or *Haemophilus vaginalis*.

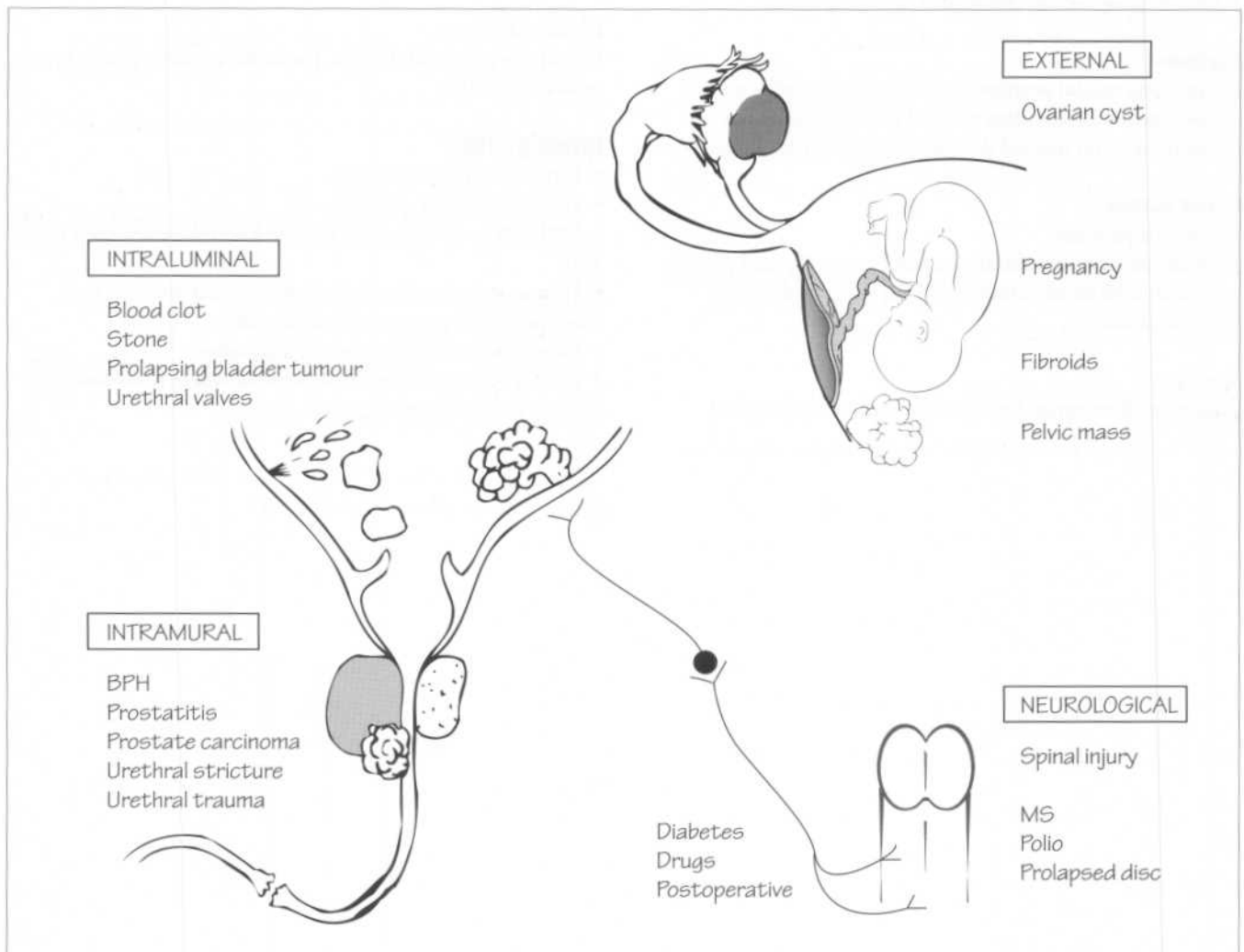
Bladder tumours

Uncommon cause of dysuria, haematuria, sterile pyuria (no growth on MSU).

Investigations

- FBC: ascending infections.
- Glucose: exclude diabetes.
- MSU MC + S: infection (include Ziehl–Neelsen stain for TB).
- Ultrasound: possible pyelonephritis/renal abscess, may show predisposing structural abnormality.
- Urography: suspected underlying causes.
- DMSA scan: assesses renal function where renal damage suspected from recurrent sepsis.

24 Urinary retention



Definitions

Urinary retention is defined as an inability to micturate. *Acute urinary retention* is the sudden inability to micturate in the presence of a painful bladder. *Chronic urinary retention* is the presence of an enlarged, full, painless bladder with or without difficulty in micturition. *Overflow incontinence* is an uncontrollable leakage and dribbling of urine from the urethra in the presence of a full bladder.

Key points

- Acute retention is characterized by pain, sensation of bladder fullness and a mildly distended bladder.
- Chronic retention is characterized by symptoms of bladder irritation (frequency, dysuria, small volume), painless, marked

distension, overflow incontinence. Often associated with secondary UTI.

- May be mechanical or neurological cause.
- Upper motor neurone causes produce chronic retention with reflex incontinence.
- Lower motor neurone causes produce chronic retention with overflow incontinence.
- Uncommon in young adults — often requires investigation to exclude underlying cause.
- Common in elderly men due to prostate pathology.

Differential diagnosis

The causes and features are listed below.

Mechanical

In the lumen of the urethra

- Congenital valves (rare): neonates, males, recurrent UTIs.
- Foreign body (rare).
- Stones (rare): acute pain in penis and glans.
- Tumour (rare): TCC or squamous cell carcinoma, history of haematuria, working in dye or rubber industry.

In the wall of the urethra

- BPH: frequency, nocturia, hesitancy, poor stream, dribbling, urgency.
- Tumour: as above.
- Stricture: history of trauma or serious infection, gradual onset of poor stream.
- Trauma: blood at meatus.

Outside the wall of the urethra

- Pregnancy.
- Fibroids: palpable, bulky uterus, menorrhagia, dysmenorrhoea.

- Ovarian cyst: mobile iliac fossa mass.
- Faecal impaction: spurious diarrhoea.

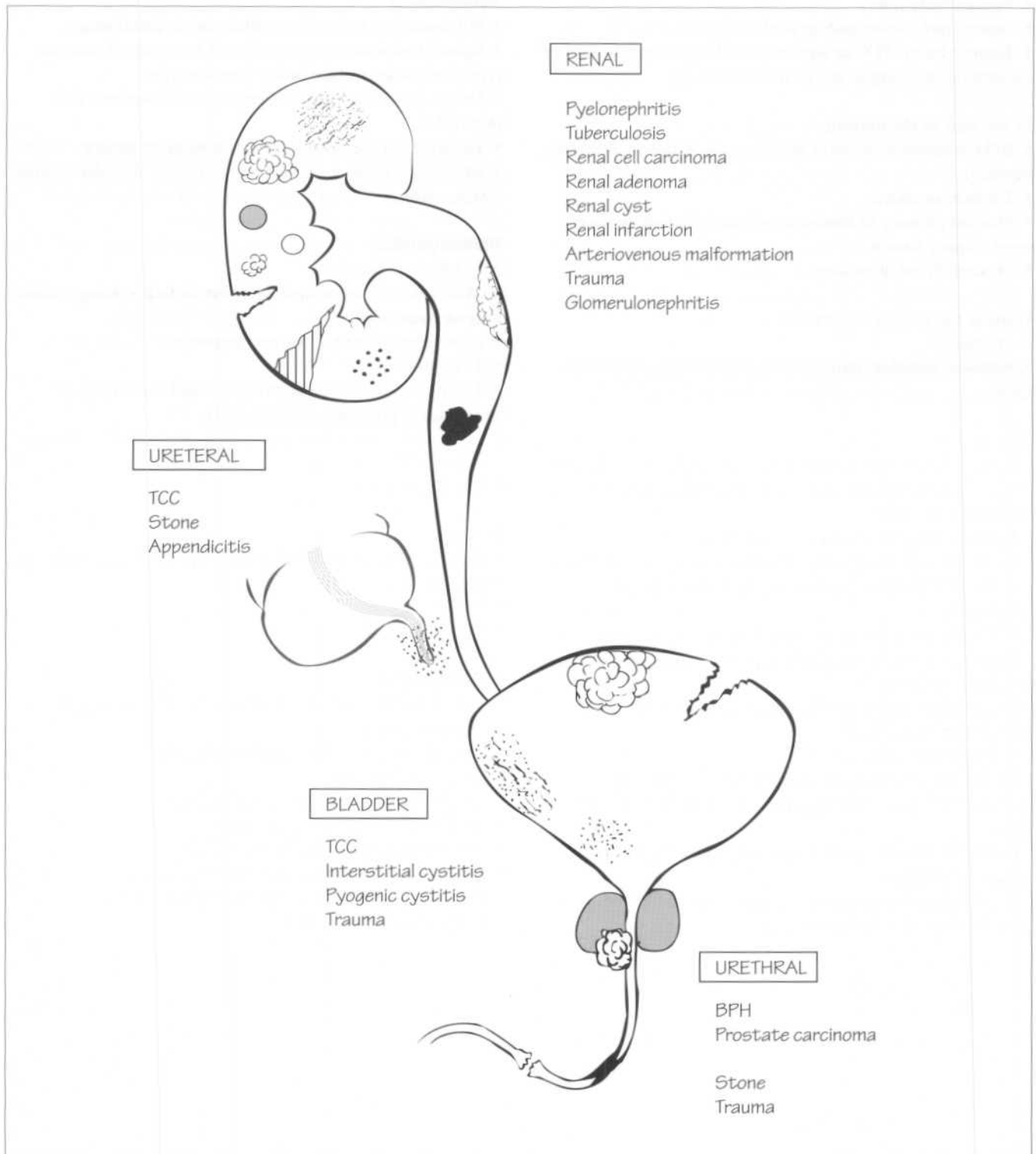
Neurological

- Postoperative: pain, drugs, pelvic nerve disturbance.
- Spinal cord injuries: acute phase is lower motor neurone type, late phase is upper motor neurone type.
- Drugs: narcotics, anticholinergics, antihistamines, anti-psychotics.
- Diabetes: progressive lower motor neurone pattern.
- Idiopathic: detrusor sphincter dyssynergia, ?bladder neurone degeneration.

Investigations

- U + E: renal function.
- MSU MC + S: associated infection, include cytology where tumour suspected.
- Cystography: urethral valves, strictures.
- IVU: stones.
- Urodynamics: allows identification and assessment of neurological problems, assesses BPH.

25 Haematuria



Definitions

Haematuria is the passage of blood in the urine. *Frank haematuria* is the presence of blood on macroscopic examination, while *microscopic haematuria* indicates that RBCs are only seen on microscopy. *Haemoglobinuria* is defined as the presence of free Hb in the urine.

Key points

- Haematuria always requires investigation to exclude an underlying cause.
- Initial haematuria (blood on commencing urination) suggests a urethral cause.
- Terminal haematuria (blood after passing urine) suggests a bladder base or prostatic cause.
- Ribbon clots suggest a pelvi-ureteric cause.
- Renal bleeding can mimic colic due to clots passing down the ureter.

Differential diagnosis

The sources, causes and features are listed below.

Kidney

- Trauma: mild to moderate trauma commonly causes renal bleeding, severe injuries may not bleed (avulsed kidney — complete disruption).
- Tumours: may be profuse or intermittent.
- Renal cell carcinoma: associated mass, loin pain, clot colic or fever, occasional polycythaemia, hypercalcaemia and hypertension.
- TCC: characteristically painless, intermittent haematuria.
- Calculus: severe loin/groin pain, gross or microscopic, associated infection.
- Glomerulonephritis: usually microscopic, associated systemic disease (e.g. SLE).
- Pyelonephritis (rare).
- Renal tuberculosis (rare): sterile pyuria, weight loss, anorexia, PUO, increased frequency of micturition day and night.
- Polycystic disease (rare): palpable kidneys, hypertension, chronic renal failure.
- Renal arteriovenous malformation or simple cyst (very rare): painless, no other symptoms.

- Renal infarction (very rare): may be caused by an arterial embolus, painful tender kidney.

Ureter

- Calculus: severe loin/groin pain, gross or microscopic, associated infection.
- TCC: see below.

Bladder

- Calculus: sudden cessation of micturition, pain in perineum and tip of penis.
- TCC: characteristically painless, intermittent haematuria, history of work in rubber or dye industries.
- Acute cystitis: suprapubic pain, dysuria, frequency and bacteriuria.
- Interstitial cystitis (rare): may be autoimmune, drug or radiation induced, frequency and dysuria common.
- Schistosomiasis (very rare): history of foreign travel, especially North Africa.

Prostate

- BPH: painless haematuria, associated obstructive symptoms, recurrent UTI.
- Carcinoma (rare).

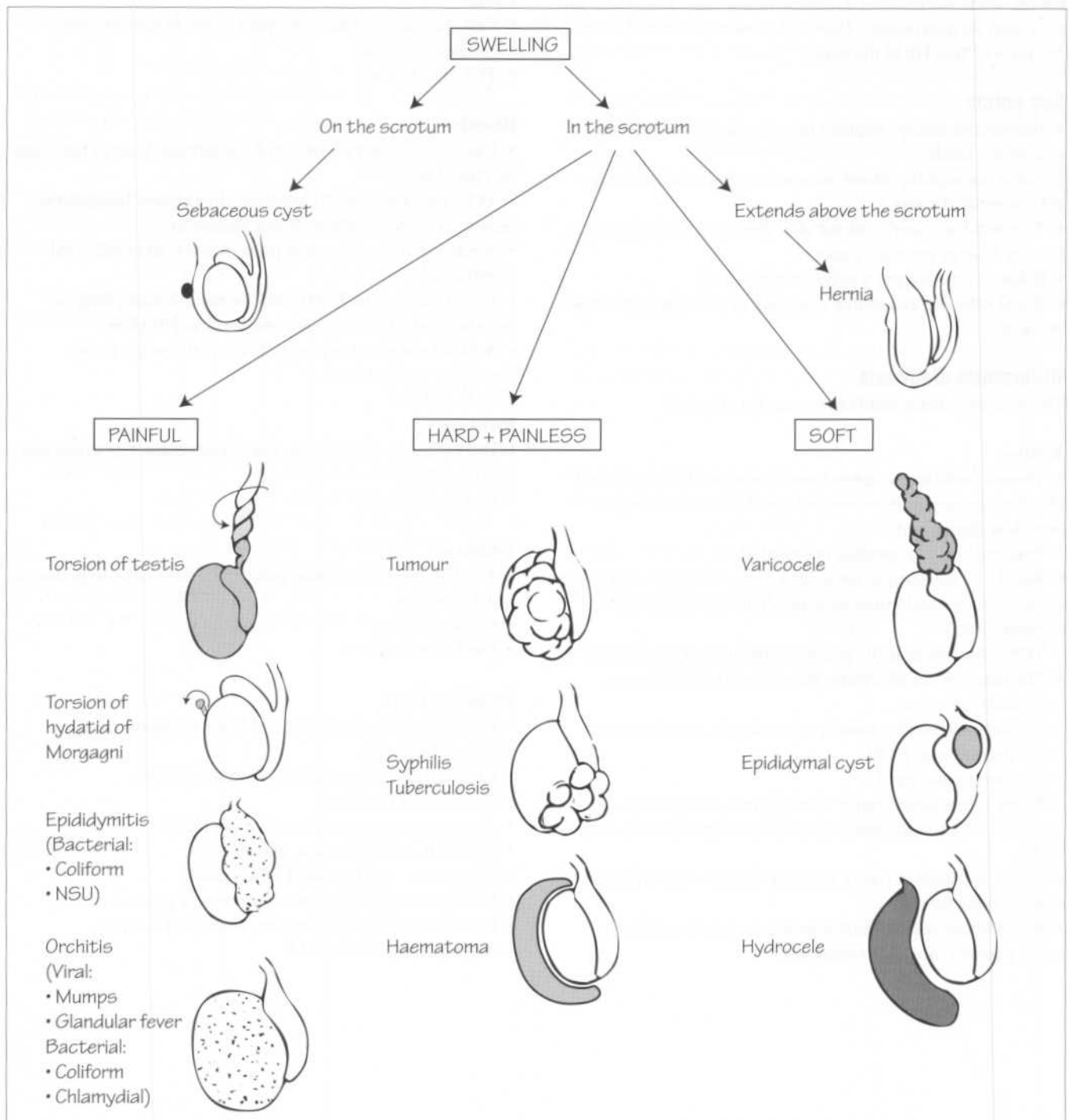
Urethra

- Trauma: blood at meatus, history of direct blow to perineum, acute retention.
- Calculus (rare).
- Urethritis (rare).

Investigations

- FBC: infection, chronic blood loss. 'Rouleaux' suggest glomerulonephritis.
- Clotting: exclude underlying bleeding cause.
- U+E: renal function.
- Autoimmune screen: glomerulonephritis.
- MSU MC + S: infection, parasites.
- Urography: renal cause, TCCs, calculi.
- CT scan: renal lesion, renal tumours or cysts.
- Cystoscopy: bladder tumours, interstitial cystitis.
- Angiography: renal AVM.

26 Scrotal swellings



Definition

Any swelling in or on the scrotum or its contents.

Key points

- Torsion is commonest in adolescence and in the early 20s. Whenever the diagnosis is suspected, urgent assessment and possibly surgery are required.
- Young adult men: tumours, trauma and acute infections are common.
- Old men: hydrocele and hernia are common.

Differential diagnosis

The causes and features are listed below.

Scrotum

- Sebaceous cyst: attached to the skin, just fluctuant, does not transilluminate.
- Infantile scrotal oedema: acute idiopathic scrotal swelling, hot, tender, bright red, testicle less tender than in torsion, commonest in young boys.

Testis

- Hydrocele: soft, fluctuant, transilluminates brilliantly, testis may be difficult to feel, new onset or rapidly recurrent hydrocele suggests an underlying testicular cause.
- Haematocele: firm, does not transilluminate, testis cannot usually be felt, history of trauma.
- Epididymal cyst: separate and behind the testis, transilluminates well, may be quite large.
- Varicocele: a collection of dilated and tortuous veins in the spermatic cord — 'bag of worms' — on examination,

commoner on the left, associated with a dragging sensation, occasional haemospermia.

- Epididymo-orchitis: painful and swollen, epididymis more than testis, associated erythema of scrotum, fever and pyuria, unusual below the age of 25 years, pain relieved by elevating the testis.
- Orchitis: confined to testis, young men.
- Torsion of the testis: rapid onset, pubertal males, often high investment of tunica vaginalis on the cord — 'bellclapper testis', testis may lie high and transversely in the scrotum, 'knot' in the cord may be felt.
- Torsion of appendix testis: mimics full torsion, early signs are a lump at the upper pole of the testis and a blue spot on transillumination, later the whole testis becomes swollen, may require explorative surgery to exclude full torsion.
- Testicular tumour: painless swelling, younger adult men (20–50 years), may have lax secondary hydrocele, associated abdominal lymphadenopathy.

Investigations

- FBC: infection.
- Ultrasound: painless, non-invasive imaging of testicle. Allows underlying pathology to be excluded in hydrocele. High sensitivity and specificity for tumours.
- Doppler ultrasound: may confirm presence of blood flow where torsion is thought unlikely.
- CT scan: staging for testicular tumours.
- Surgery: may be the only way to confirm or exclude torsion in a high-risk group. Should not be delayed for any other investigation if required.

Part 2 Surgical Diseases at a Glance

27 Hypoxia

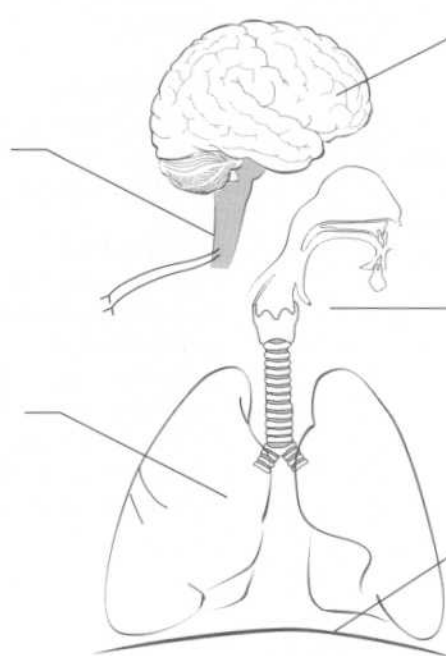
GENERAL CAUSES

2 NEUROMUSCULAR FAILURE

- CVA
- Multiple sclerosis
- Polio
- Neuropathies
- Myasthenia gravis
- Myopathy

5 LOSS OF FUNCTIONAL LUNG

- Collapse
- Infection
- ARDS
- Pulmonary embolism
- Pulmonary oedema



1 CNS DEPRESSION

- Drugs
 - Opiates
 - Alcohol
 - Benzodiazepines
- Hypercapnia
- Acidosis
- CVA

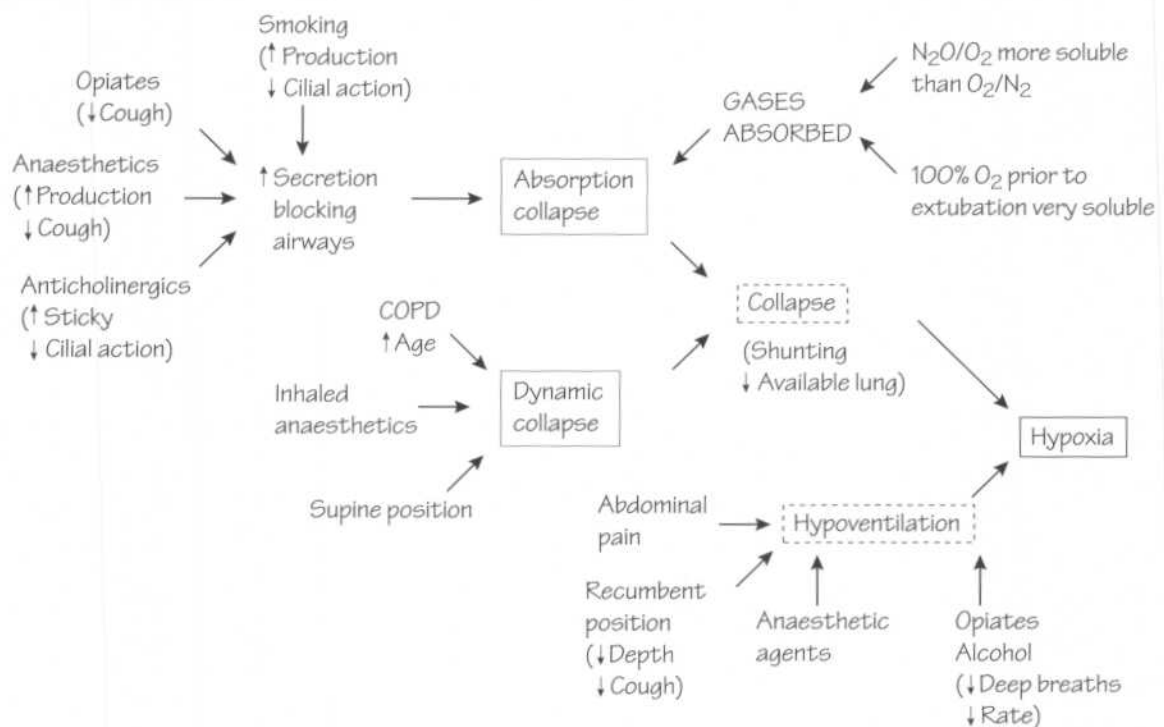
3 AIRWAY OBSTRUCTION

- Facial fractures
- Neck haematoma
- Foreign bodies

4 MECHANICAL INFLATION FAILURE

- Abdominal pain
- Pneumothorax
- Flail chest
- Large pleural effusion

POSTOPERATIVE HYPOXIA



Definitions

Hypoxia is defined as a lack of O_2 generally. *Hypoxaemia* is a lack of O_2 in arterial blood. *Apnoea* means cessation of breathing in expiration.

Common causes

- Impaired level of consciousness.
- Facial fractures.
- Aspiration of blood or vomit.
- Upper airway obstruction from thyroid disease or cervical malignancy.
- Ventilation-perfusion mismatch (e.g. pulmonary embolism, pneumothorax).
- Right to left pulmonary shunt.

Clinical features

In the unconscious patient

- Central cyanosis.
- Abnormal respirations.
- Hypotension.

In the conscious patient

- Central cyanosis.
- Anxiety and restlessness.
- Confusion.
- Stridor.
- Apnoea.

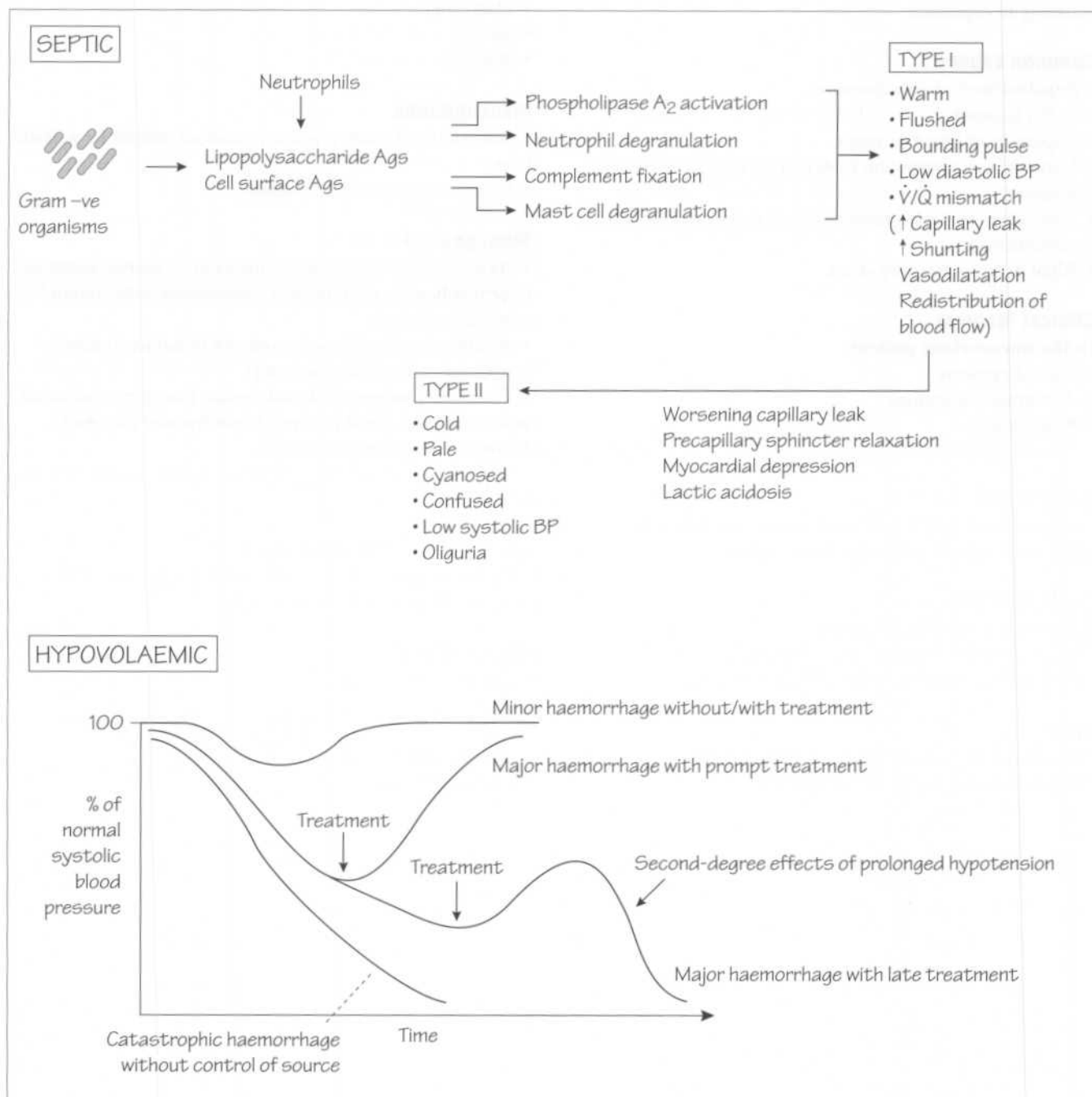
Investigations

- Arterial blood gases: respiratory acidosis, metabolic acidosis later.
- Chest radiograph/ECG: portable.

Management

- Airway control (triple airway manoeuvre, suction secretions, clear oropharynx, endotracheal intubation/cricothyrotomy/minitracheostomy).
- Breathing support (mouth-to-mouth or mouth-to-airway ventilation, self-refilling bag unit).
- Circulatory support (external cardiac massage coordinated with ventilation, good i.v. line, do not fracture the ribs!).
- Determine and treat the cause.

28 Shock



Definitions

Shock is defined as acute circulatory failure with inadequate or inappropriate tissue perfusion resulting in generalized cellular hypoxia.

Common causes

Hypovolaemic

- Blood loss (ruptured abdominal aortic aneurysm, upper GI bleed, multiple fractures, etc.).
- Plasma loss (burns, pancreatitis).
- Extracellular fluid losses (vomiting, diarrhoea, intestinal fistula).

Cardiogenic

- Myocardial infarction.
- Ventricular arrhythmias.
- Pulmonary embolus.
- Cardiac tamponade.

Septic

- Gram-negative or, less often, Gram-positive infections.

Anaphylactic

- Release of vasoactive substances when a sensitized individual is exposed to the appropriate antigen.

Clinical features

Hypovolaemic and cardiogenic

- Pallor, coldness, sweating and restlessness.
- Tachycardia, weak pulse, low BP and oliguria.

Septic

- Initially warm flushed skin and bounding pulse.
- Later confusion and low output picture.

Investigations and assessment

- Monitor pulse, BP, temperature, respiratory rate and urinary output.
- Establish good i.v. access and set up CVP line (possibly Swan–Ganz catheter as well).
- ECG and cardiac enzymes.
- Hb, Hct, U + E, creatinine.
- Group and crossmatch blood.
- Obtain blood cultures.
- Arterial blood gases.

Management

Resuscitate the patient

- Hypovolaemic: ABC (p. 57), give 100% O₂, restore circulating volume with crystalloids, colloids or blood depending on the cause.
- Cardiogenic: bed rest, adequate analgesia, thrombolytic therapy and aspirin if MI, treat heart failure and arrhythmias.
- Septic: give fluids to restore circulating volume, treat infection with antibiotics ± surgery, inotropes are frequently required.
- Anaphylaxis: i.v. fluids, adrenaline, antihistamines, hydrocortisone.

Deal with the cause of the shock

- For example, stop the bleeding, drain the abscess, remove the source of the anaphylactic antigen, etc.

Complications

- | | | |
|---|---|--------------|
| <ul style="list-style-type: none">• ARDS.• ARF.• DIC.• Hepatic failure.• Stress ulceration. | } | SIRS
MODS |
|---|---|--------------|

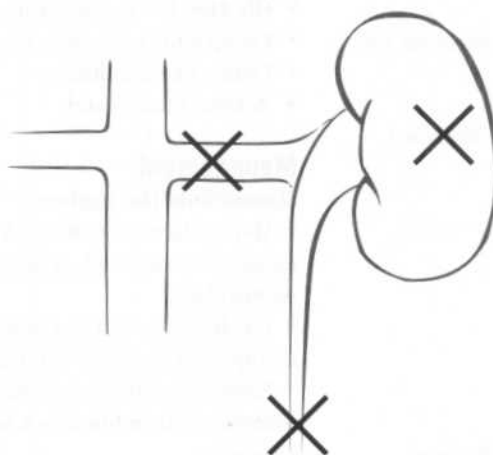
29 Acute renal failure

CAUSES

PRERENAL

Hypoperfusion

- Hypovolaemia
- Septicaemia
- Hypoxaemia
- Nephrotoxins
- Pancreatitis
- Liver cell dysfunction
 - Bilirubin
 - Other toxins



RENAL

- Any established cause of prerenal or postrenal
- Glomerular damage
 - Glomerulonephritis
- Tubular damage
 - Toxins
 - Drugs
 - Pyelonephritis
- Vascular damage
 - Acute vasculitis
 - Diabetes
 - Hypertension

POSTRENAL

- Primary tumours
- Secondary tumours — invasion
- Stones
- Blood clots
- Bladder obstruction
- Infestations (worms)

FEATURES

	Normal	Prerenal	Renal	Postrenal
$U_{\text{osmolality}}$	Approx 400–500 mosm/kg	> 500	< 400	Normal
U_{Na^+}	10–20 mmol/l	< 10	> 20	Normal
$U_{\text{urea}}/P_{\text{urea}}$	Approx 5/1	> 10/1	3/1–1/1	Normal
$U_{\text{osm}}/P_{\text{osm}}$	Approx 1.5/1	> 2/1	< 1.1/1	Normal
Findings	—	Concentrated urine ? Findings due to cause	Casts RBCs Protein	Normal urine ? Findings due to cause

Definitions

Acute renal failure is a sudden deterioration in renal function such that neither kidney is capable of excreting body waste products (e.g. urea, creatinine, potassium) that accumulate in the blood. It is fatal unless treated. *Anuria* means no urine is passed in a day. *Oliguria* means that less than 400 ml/day is passed.

Common causes

Prerenal failure

- Shock causing reduced renal perfusion.

Intrinsic renal failure

- Shock causing renal ischaemia (*acute tubular necrosis*).
- Nephrotoxins (aminoglycosides, myoglobin).
- Acute glomerulonephritis.
- Severe pyelonephritis.
- Hypertension and diabetes mellitus.

Postrenal failure

- Urinary tract obstruction, e.g. prostatic hypertrophy.

Clinical features

- Dyspnoea, confusion, drowsiness, coma.
- Hypertension, arrhythmias.
- Nausea, vomiting, hiccoughs, diarrhoea, GI haemorrhage.
- Anaemia and coagulation defects.

Investigations

- U + E (especially K^+).
- Creatinine estimation.
- ECG/chest X-ray.
- Arterial blood gases — metabolic acidosis.

Management

Prevention

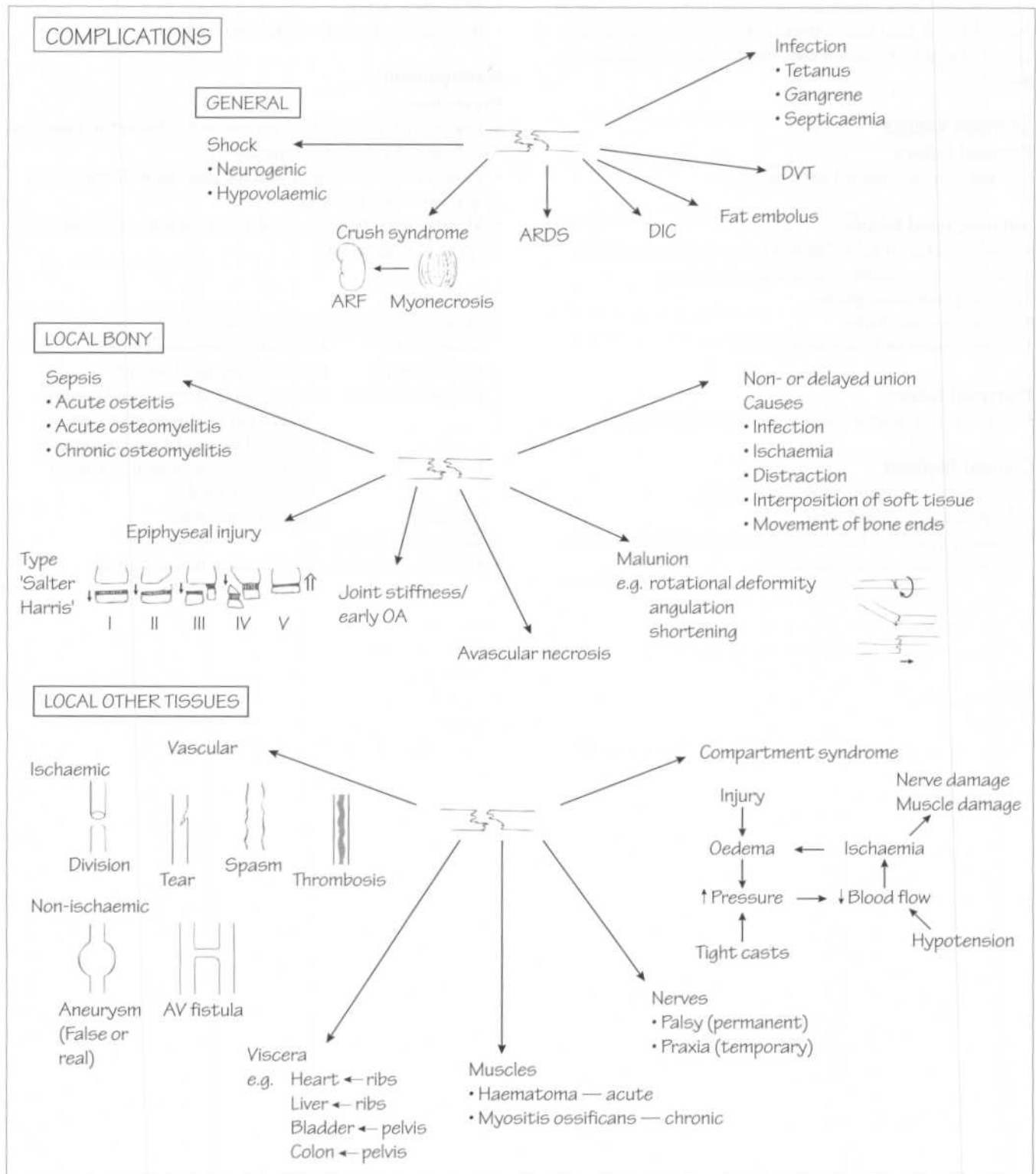
- Keep at-risk patients (e.g. patients with obstructive jaundice) well hydrated pre- and peroperatively.
- Protect renal function in selected patients with drugs such as *dopamine* and *mannitol*.
- Monitor renal function regularly in patients on nephrotoxic drugs (e.g. gentamicin).

Treatment

- Maintain fluid and electrolyte balance.

Water intake	400 ml/day + measured losses
Sodium intake	Limited to replace loss only
Potassium intake	Nil (frequently dextrose and insulin and/or ion-exchange resins are required to control hyperkalaemia)
Diet	High calorie, low protein in a small volume of fluid
Acidosis	Sodium bicarbonate
- Treat any infection.
- Dialysis: peritoneal, ultrafiltration, haemodialysis.

30 Fractures



Definitions

- A *fracture* is a break in the continuity of a bone.
- Fractures may be *transverse*, *oblique* or *spiral* in shape.
- In a *greenstick* fracture, only one side of the bone is fractured, the other simply bends.
- A *comminuted* fracture is one in which there are more than two fragments of bone.
- In a *complicated* fracture, some other structure is also damaged (e.g. a nerve or blood vessel).
- In a *compound* fracture, there is a break in the overlying skin.
- A *pathological* fracture is one through a bone weakened through disease, e.g. a metastasis.

Common causes

Fractures occur when excessive force is applied to a normal bone or moderate force to a diseased bone, e.g. osteoporosis.

Clinical features

- Pain.
- Loss of function.
- Deformity, tenderness and swelling.
- Discoloration or bruising.
- (Crepitus, not to be elicited!)

Investigations

- Radiographs in two planes (look for lucencies and discontinuity in the cortex of the bone).
- Tomography, CT scan, MRI scan — rarely.
- Ultrasonography and radioisotope bone scanning.

Management

General

- Look for shock/haemorrhage and check ABC (see p. 57).

- Look for injury in other areas at risk (head and spine, ribs and pneumothorax, femoral and pelvic injury).

The fracture

Immediate

- Relieve pain (opiates i.v., nerve blocks, splints, traction).
- Establish good i.v. access and send blood for group and crossmatch.
- Open (*compound*) fractures require debridement, antibiotics and tetanus prophylaxis.

Definitive

- Reduction (closed or open).
- Immobilization (casting, functional bracing, internal fixation, external fixation, traction).
- Rehabilitation (aim to restore patient to pre-injury level of function with physiotherapy and occupational therapy).

Complications

Early

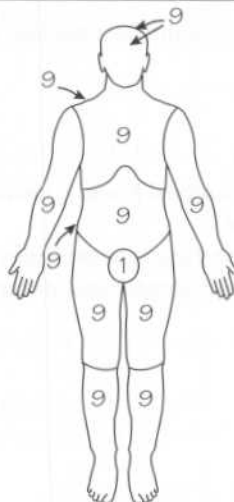
- Blood loss.
- Infection.
- Fat embolism.
- DVT and PE.
- Renal failure.
- Compartment syndrome.

Late

- Non-union.
- Delayed union.
- Malunion.
- Growth arrest.
- Arthritis.
- Post-traumatic sympathetic (reflex) dystrophy.

31 Burns

WALLACE'S RULE OF 9's



11 x 9 = 99%

TYPES

	Partial	Full
Colour	Red	White
Blanching	Yes	None
Pain	+++	None
Light touch	Pain	None
Hair	Preserved	Lost

Major burn = 30% surface area +
or Age < 5 > 60
or Airway burn
or Perineal/ocular/hands burns

COMPLICATIONS

LOCAL

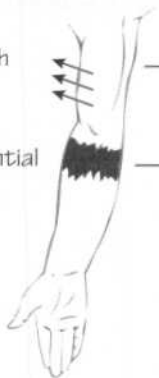
Corneal burns



Protective tarsorrhaphy
Chloramphenicol ointment

Albumin-rich
fluid loss

Circumferential
burns



H Albumin i.v.

Escharotomy

Perineal
burns



Catheterization

Treatment

O₂ 100%
Neb adrenaline

IPPV
O₂

i.v. H₂ blockers
Naso-gastric sucralfate
Naso-gastric tube

Naso-gastric tube
Fluids i.v.

Antibiotics

Heparin FFP

Nutritional
support

GENERAL/SYSTEMIC

Laryngeal oedema
Bronchospasm

ARDS

Inhalational
pneumonitis

Acute gastric ulceration
(Curling's ulcer)

Pancreatitis

Acute renal failure

Sepsis

Disseminated intravascular
coagulation

Hypercatabolism
Proteolysis

Definitions

A *burn* is the response of the skin and subcutaneous tissues to thermal injury. A *partial thickness* burn is a superficial burn which usually heals with conservative management. A *full thickness* burn requires excision and skin grafting.

Common causes

- Thermal injury from dry (flame, hot metal) or moist (hot liquids or gases) heat sources.
- Electricity (deep burns at entry and exit sites, may cause cardiac arrest).
- Chemicals (usually industrial accidents with acid or alkali).
- Radiation (partial thickness initially, but may progress to chronic deeper injury).

Clinical features

General

- Pain.
- Swelling and blistering.

Specific

- Evidence of smoke inhalation (soot in nose or sputum, burns in the mouth, hoarseness).
- Eye or eyelid burns (early ophthalmological opinion).
- Circumferential burns (will need escharotomy).

Investigations

- FBC.
- U + E.
- If inhalation suspected:
 - chest X-ray;
 - arterial blood gases;
 - CO estimation.
- Blood group and crossmatch.
- ECG/cardiac enzymes with electrical burns.

Management

General

- Start resuscitation (ABC (see p. 57), set up good i.v. lines, give O₂).

- Assess size of burn (Wallace's rule of 9's):
 - major >15% burn in adult, >10% in child;
 - minor <15% burn in adult, <10% in child.

Major burns

- Monitor pulse, BP, temperature, urinary output, give adequate analgesia i.v., pass naso-gastric tube, tetanus prophylaxis.
- Give i.v. fluids according to Muir-Barclay formula:

$$\frac{\% \text{ burn} \times \text{wt in kg}}{2} = \text{one aliquot of fluid.}$$

Give six aliquots of fluid over first 36 hours in 4, 4, 6, 6, 12-hour sequence from time of burn. Crystalloid and colloid solutions are used.

- The burn wound is treated as for minor burns (see below).

Minor burns

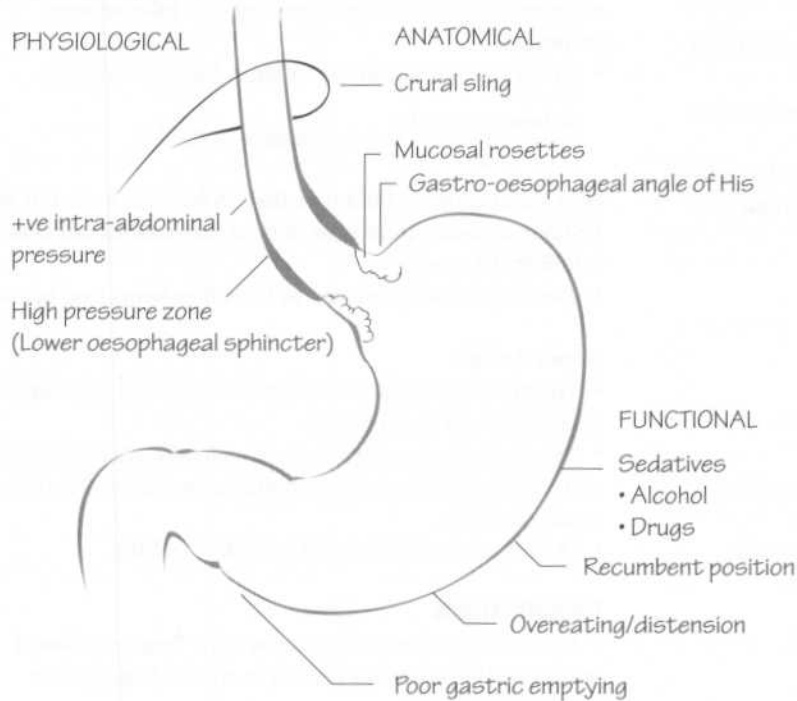
- Treatment by exposure — debride wound and leave exposed in special clean environment.
- Treatment by dressings — cover with tulle gras impregnated with chlorhexidine or silver sulphadiazine under absorptive gauze dressings.
- Debridement of eschar and split skin grafting.

Complications

- Infection (beware the *Streptococcus*). Treat established infection (10⁶ organisms present in wound biopsy) with systemic antibiotics.
- Limb ischaemia from circumferential burn (prevent by escharotomy).
- Stress ulceration (Curling's ulcer) (prevent with antacid or H₂-blocker prophylaxis).
- Contractures.

32 Gastro-oesophageal reflux

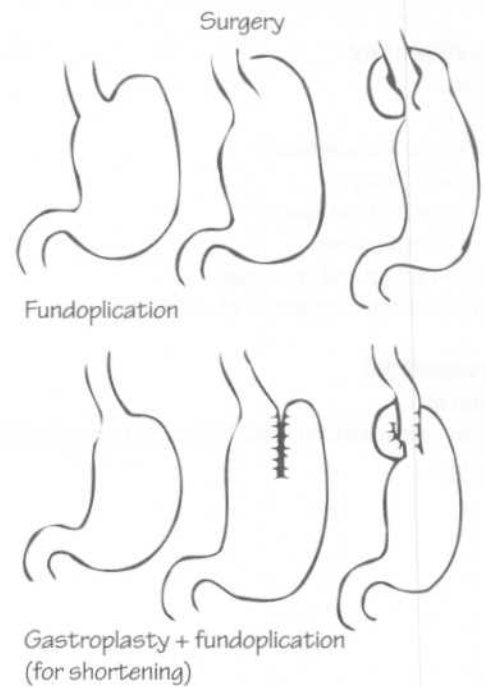
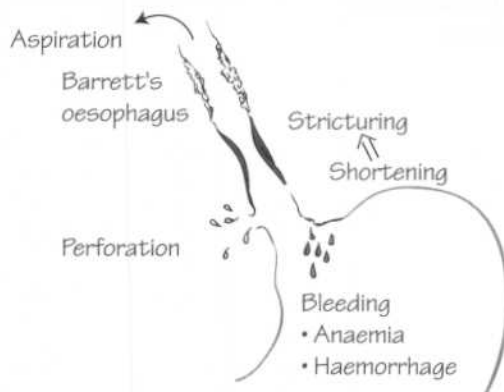
CAUSES



Grades of oesophagitis

- I Erythema
- II Erosions
- III Confluent erosions/ulcers
- IV Stricture
- B Barrett's change

COMPLICATIONS



Definitions

Gastro-oesophageal reflux is a condition caused by the retrograde passage of gastric contents into the oesophagus resulting in inflammation (*oesophagitis*), which manifests as dyspepsia. A *hiatus hernia* is an abnormal protrusion of the proximal stomach through the oesophageal opening in the diaphragm resulting in a more proximal positioning of the oesophago-gastric junction and predisposition to gastro-oesophageal reflux. *Sliding* (common) and *rolling* or *para-oesophageal* (rare) hiatus hernias are recognized.

Common causes

- Failure of normal mechanisms of gastro-oesophageal continence (LOS pressure, length of intra-abdominal LOS, angle of His, sling fibres around the cardia, the crural fibres of the diaphragm, the mucosal rosette).
- LOS pressure reduced by smoking, alcohol and coffee.

Clinical features

- Retrosternal burning pain, radiating to epigastrium, jaw and arms. (Oesophageal pain is often confused with cardiac pain.)
- Regurgitation of acid contents into the mouth (waterbrash).
- Back pain (a penetrating ulcer in Barrett's oesophagus).
- Dysphagia from a benign stricture.

Investigations

- Barium swallow and meal: sliding hiatus hernia, oesophageal ulcer, stricture.

- Oesophagoscopy: assess oesophagitis, biopsy for histology, dilate stricture if present.
- 24-hour pH monitoring: assess the degree of reflux.

Management

General

- Lose weight, avoid smoking, coffee, alcohol and chocolate.
- Avoid tight garments and stooping.

Medical

- Control acid secretion (H_2 receptor antagonists (e.g. ranitidine) or proton pump inhibitors (e.g. omeprazole)).
- Minimize effects of reflux (give alginates to protect oesophagus).
- Prokinetic agents (e.g. metoclopramide, cisapride) improve LOS tone and promote gastric emptying.

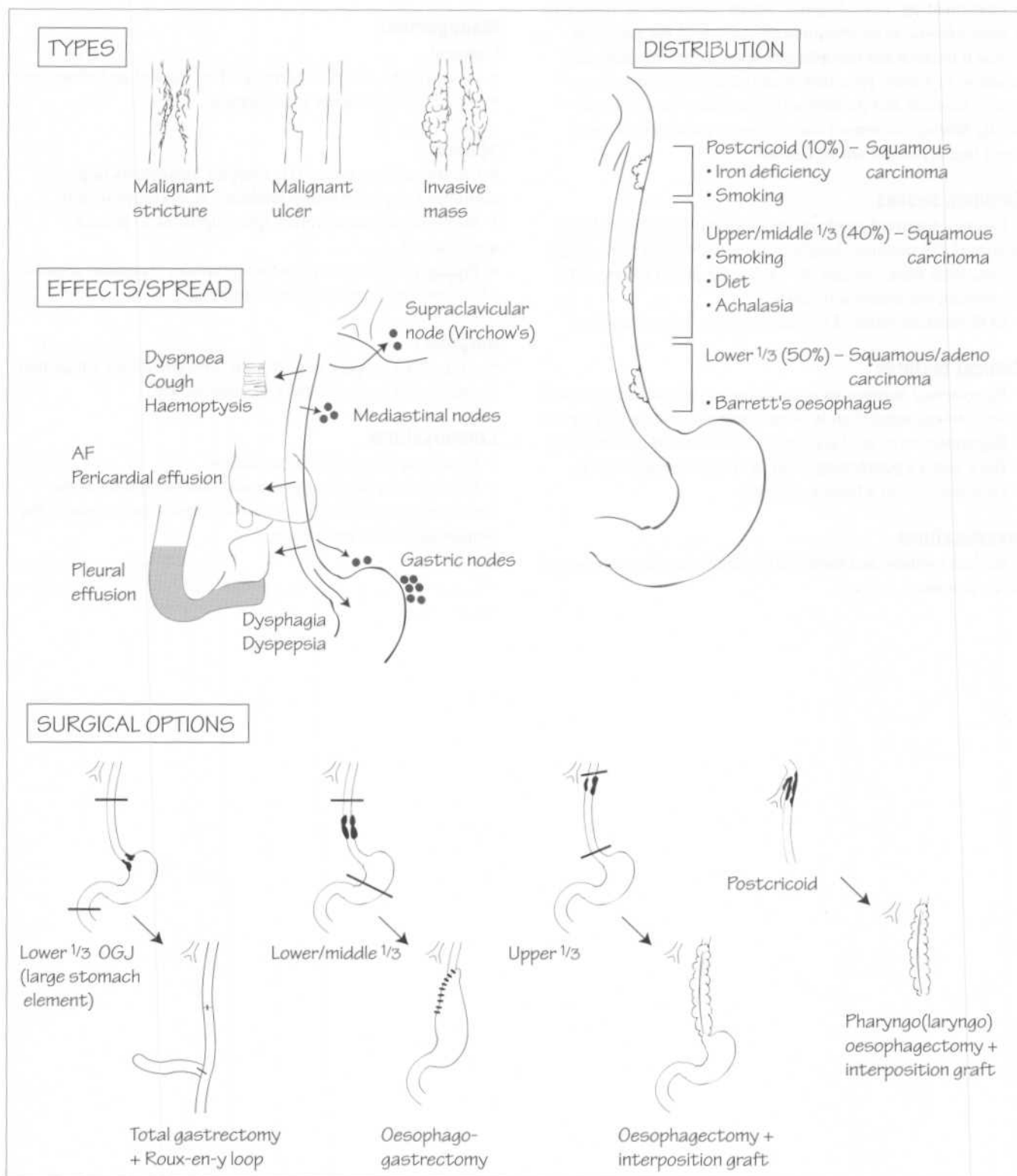
Surgical

- Anti-reflux surgery (e.g. Nissen fundoplication) which may be performed by laparotomy or laparoscopy.

Complications

- Benign stricture of the oesophagus.
- Barrett's oesophagus (a premalignant metaplasia of the lower oesophagus in which columnar epithelium replaces the normal squamous epithelium).

33 Oesophageal carcinoma



Definition

Malignant lesion of the oesophagus.

Epidemiology

Male/female 3:1. Age 50–70 years. High incidence in areas of China, Russia, Scandinavia and among the Bantu in South Africa.

Aetiology

The following are predisposing factors.

- Alcohol consumption and cigarette smoking.
- Chronic oesophagitis and Barrett's oesophagus.
- Stricture from corrosive (lye) oesophagitis.
- Achalasia.
- Plummer–Vinson syndrome (oesophageal web, mucosal lesions of mouth and pharynx, and iron deficiency anaemia).
- Nitrosamines.

Pathology

- Histological type: 90% squamous carcinoma (upper two-thirds of oesophagus); 10% adenocarcinoma (lower third of oesophagus).
- Spread: lymphatics, direct extension, vascular invasion.

Clinical features

- Dysphagia progressing from solids to liquids.
- Weight loss and weakness.
- Aspiration pneumonia.

Investigations

- Barium swallow: narrowed lumen with 'shouldering'.
- Oesophagoscopy: malignant stricture.
- Bronchoscopy: assess bronchial invasion with upper third lesions.
- CT scanning: assess degree of spread if surgery is being contemplated.

Management

Palliation

- Intubation with Atkinson or Celestine tube or expanding endoprosthesis.
- Intraluminal irradiation with iridium wires.
- Laser resection of the tumour.
- Surgical excision of the tumour.

Curative treatment

- Surgical resection is curative only if lymph nodes are not involved. Reconstruction is by gastric 'pull-up' or colon interposition.

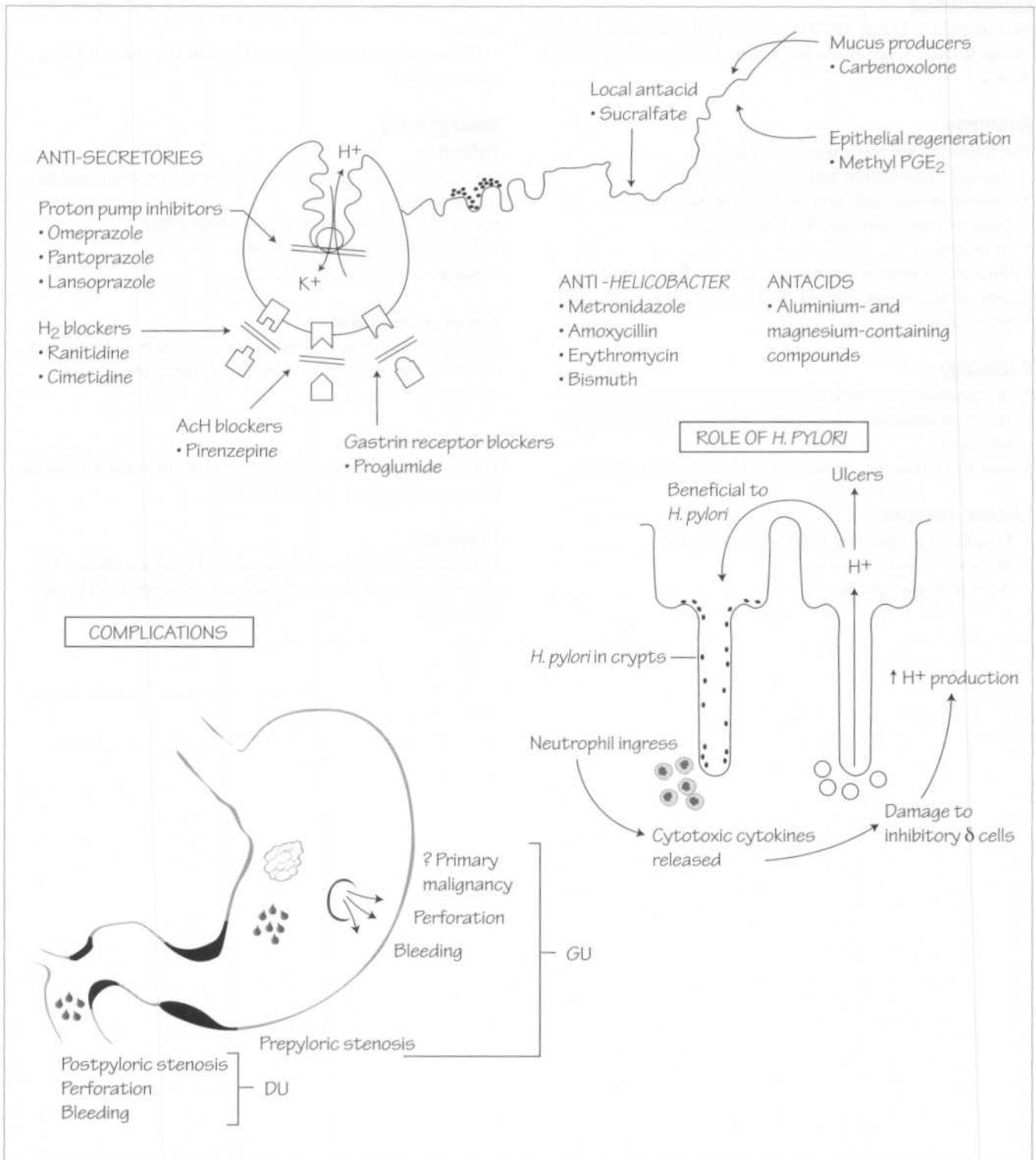
Other treatment

- Combination therapy with external beam radiation, chemotherapy and surgery is under trial.

Prognosis

- Following resection, 5-year survival rates are about 15%, but overall 5-year survival (palliation and resection) is only about 4%.

34 Peptic ulceration



Definition

A peptic ulcer is a break in the epithelial surface of the oesophagus, stomach or duodenum (rarely Meckel's diverticulum) caused by the action of gastric secretions (acid and pepsin) and, in the case of duodenal ulceration, infection with *Helicobacter pylori*. Remember the aphorism 'no acid, no ulcer'.

Common causes

- Imbalance between acid/pepsin secretion and mucosal defence.
- Acid hypersecretion occurs because of increased numbers of parietal cells (or rarely in response to gastrin hypersecretion in the Zollinger–Ellison syndrome).
- Defects in mucosal defence (e.g. mucus secretion).
- NSAIDs and the usual suspects (!) alcohol, cigarettes and 'stress'.

Clinical features

Duodenal ulcer and type II gastric ulcer (i.e. prepyloric and antral)

- Male/female 4:1, 25–50 years.
- Epigastric pain during fasting (hunger pain), relieved by food/antacids, typically exhibits periodicity.
- Boring back pain if ulcer is penetrating posteriorly.
- Haematemesis from ulcer penetrating gastroduodenal artery posteriorly.
- Peritonitis if perforation occurs with anterior duodenal ulcer.
- Vomiting if gastric outlet obstruction (pyloric stenosis) occurs (note succussion splash and watch for hypokalaemic, hypochloraemic alkalosis).

Type I gastric ulcer (i.e. body of stomach)

- Male/female 3:1, 50+ years.

- Epigastric pain induced by eating.
- Weight loss.
- Nausea and vomiting.
- Anaemia from chronic blood loss.

Investigations

- FBC.
- U+E.
- Faecal occult blood.
- OGD.
- Barium meal.

Management

Medical

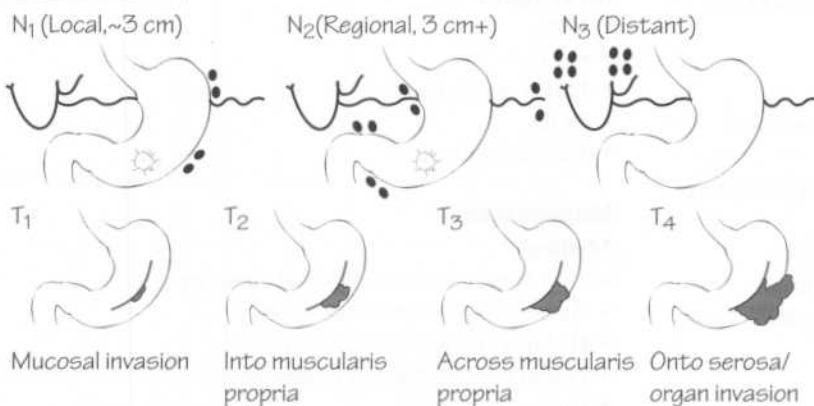
- Avoid smoking and foods that cause pain.
 - Antacids for symptomatic relief.
 - H₂ blockers (ranitidine, cimetidine).
 - Proton pump inhibitors (omeprazole).
 - Colloidal bismuth.
 - Ampicillin or tetracycline + metronidazole.
 - Re-endoscopy patients with gastric ulcer after 6 weeks because of risk of malignancy.
- } These are effective against *Helicobacter pylori*

Surgical

- Only indicated for failure of medical treatment and complications.
- Elective for duodenal ulcer: highly selective vagotomy.
- Elective for gastric ulcer: Billroth I gastrectomy.
- Perforated duodenal/gastric ulcer: simple closure of perforation and biopsy.
- Haemorrhage: endoscopic control by sclerotherapy, under-sewing bleeding vessel ± vagotomy.
- Pyloric stenosis: gastroenterostomy ± truncal vagotomy.

35 Gastric carcinoma

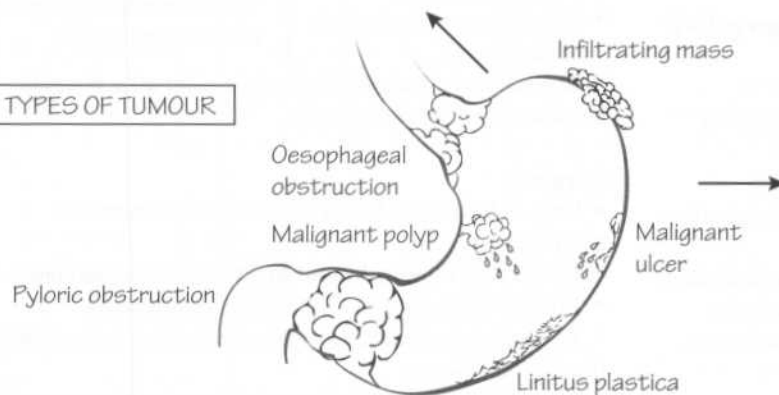
TNM STAGING



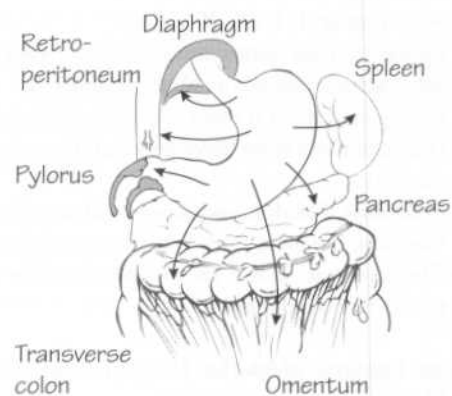
PROGNOSIS

Stage		5-year survival
1	T ₁₋₂ N ₀ M ₀	75%
2	T ₁₋₄ N ₁₋₂ M ₀	35%
3	T ₁₋₃ N ₁₋₃ M ₀	10%
4	T ₄ N ₃ M ₁	2%

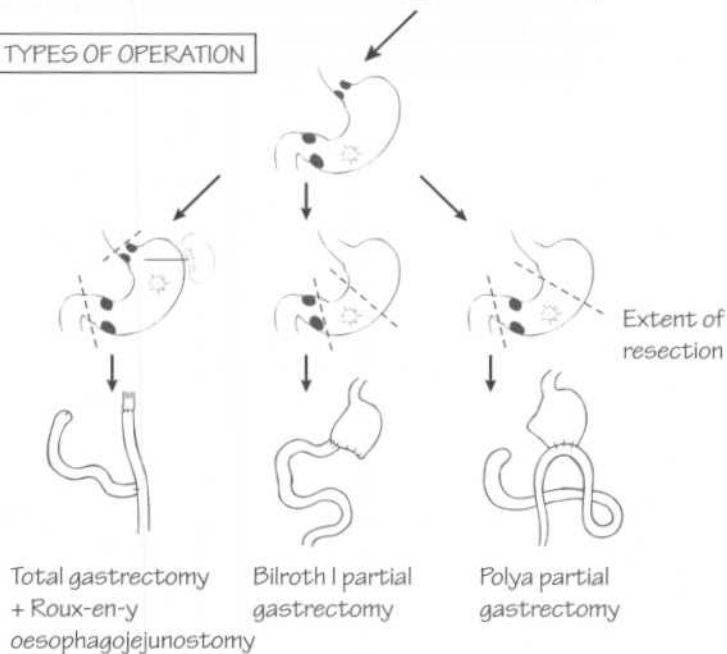
TYPES OF TUMOUR



SITES OF SPREAD



TYPES OF OPERATION



PALLIATIVE TREATMENT

Gastrojejunostomy



Laser therapy (oesophageal obstruction)
Chemotherapy
Alcohol injection (bleeding)

Definition

Malignant lesion of the stomach.

Epidemiology

Male/female 2:1. Age 50+ years. Incidence has decreased in Western World over last 50 years. Still common in Japan, Chile and Scandinavia.

Aetiology

The following are predisposing factors.

- Diet (smoked fish, pickled vegetables, benzpyrene, nitrosamines).
- Atrophic gastritis.
- Pernicious anaemia.
- Previous partial gastrectomy.
- Familial hypogammaglobulinaemia.
- Gastric adenomatous polyps.
- Blood group A.

Pathology

- Histology — adenocarcinoma.
- Advanced gastric cancer (penetrated muscularis propria) may be polypoid, ulcerating or infiltrating (i.e. linitus plastica).
- Early gastric cancer (confined to mucosa or submucosa).
- Spread:
 - lymphatic (e.g. Virchow's node);
 - haematogenous to liver, lung, brain;
 - transcoelomic to ovary (Krukenberg tumour).

Clinical features

- History of recent dyspepsia (epigastric discomfort, postprandial fullness, loss of appetite).

- Anaemia.
- Dysphagia.
- Vomiting.
- Weight loss.
- The presence of physical signs usually indicates advanced (incurable) disease.

Investigations

- FBC.
- U + E.
- Faecal occult blood.
- OGD (see the lesion and obtain biopsy to distinguish from benign gastric ulcer).
- Barium meal (space-occupying lesion/ulcer with rolled edge).

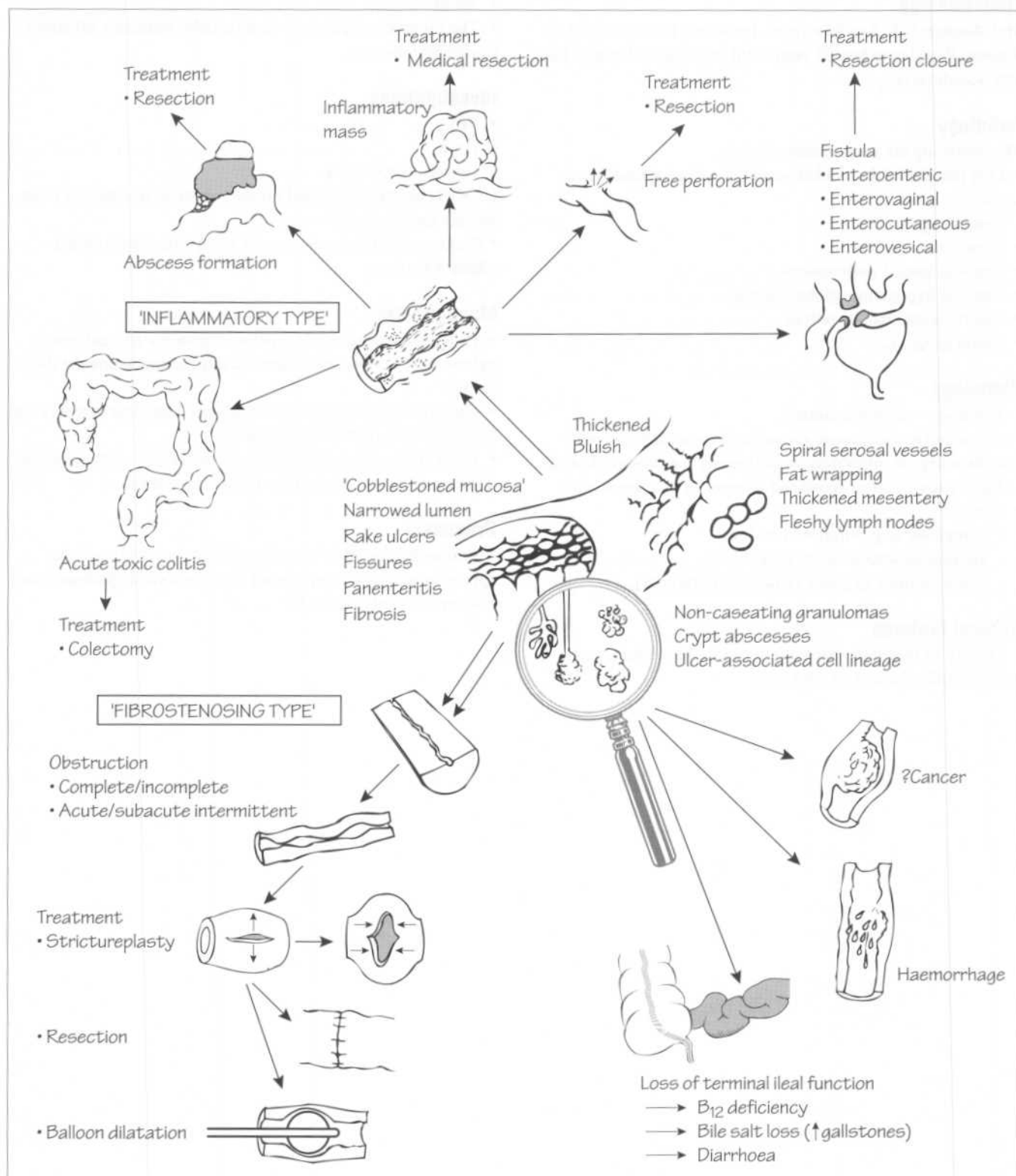
Management

- Palliation: gastrectomy, gastroenterostomy for malignant pyloric obstruction, intubation for obstructing lesions at the cardia.
- Curative treatment: surgical excision with clear margins and locoregional lymph node clearance.
- Other treatment: combination chemotherapy with etoposide, adriamycin and cisplatin may induce regression.

Prognosis

- Following 'curative' resection, 5-year survival rates are approximately 20%, but overall 5-year survival (palliation and resection) is only about 5%.

36 Crohn's disease



Definition

Crohn's disease is a chronic transmural inflammatory disorder of the alimentary tract.

Epidemiology

Male/female 1:1.6. Young adults. High incidence among Europeans and Jews.

Aetiology

- Unknown.
- Impaired cell-mediated immunity.

Pathology

Macroscopic

- May affect any part of the alimentary tract.
- Skip lesions in bowel (affected bowel wall and mesentery are thickened and oedematous, frequent fistulae).
- Perianal disease characterized by perianal induration and sepsis with fissure, sinus and fistula formation.

Histology

- Transmural inflammation.
- Non-caseating epithelioid cell granulomas with Langhans giant cells. Regional nodes may also be involved.

Clinical features

- Abdominal pain, some present with appendicitis picture, some with intestinal obstruction, fistulae or abscesses.
- General ill health, malnutrition, anaemia.

- Extra-intestinal features:
 - eye: episcleritis, uveitis;
 - joints: arthritis;
 - skin: erythema nodosum.
- Perianal disease, fissure *in ano*, fistula *in ano*, perianal sepsis.

Investigations

- FBC: macrocytic anaemia.
- Small bowel enema: narrowed terminal ileum, 'string sign' of Kantor, stricture formation fistulae.
- Abdominal ultrasound: abscess formation.
- Indium-labelled white-cell scan.

Management

Medical

- Nutritional support (enteral and parenteral feeding).
- Anti-inflammatory drugs (Salazopyrin, steroids).
- Antibiotics (only for specific complicating bacterial infections).
- Immunosuppressive agents (azathioprine).

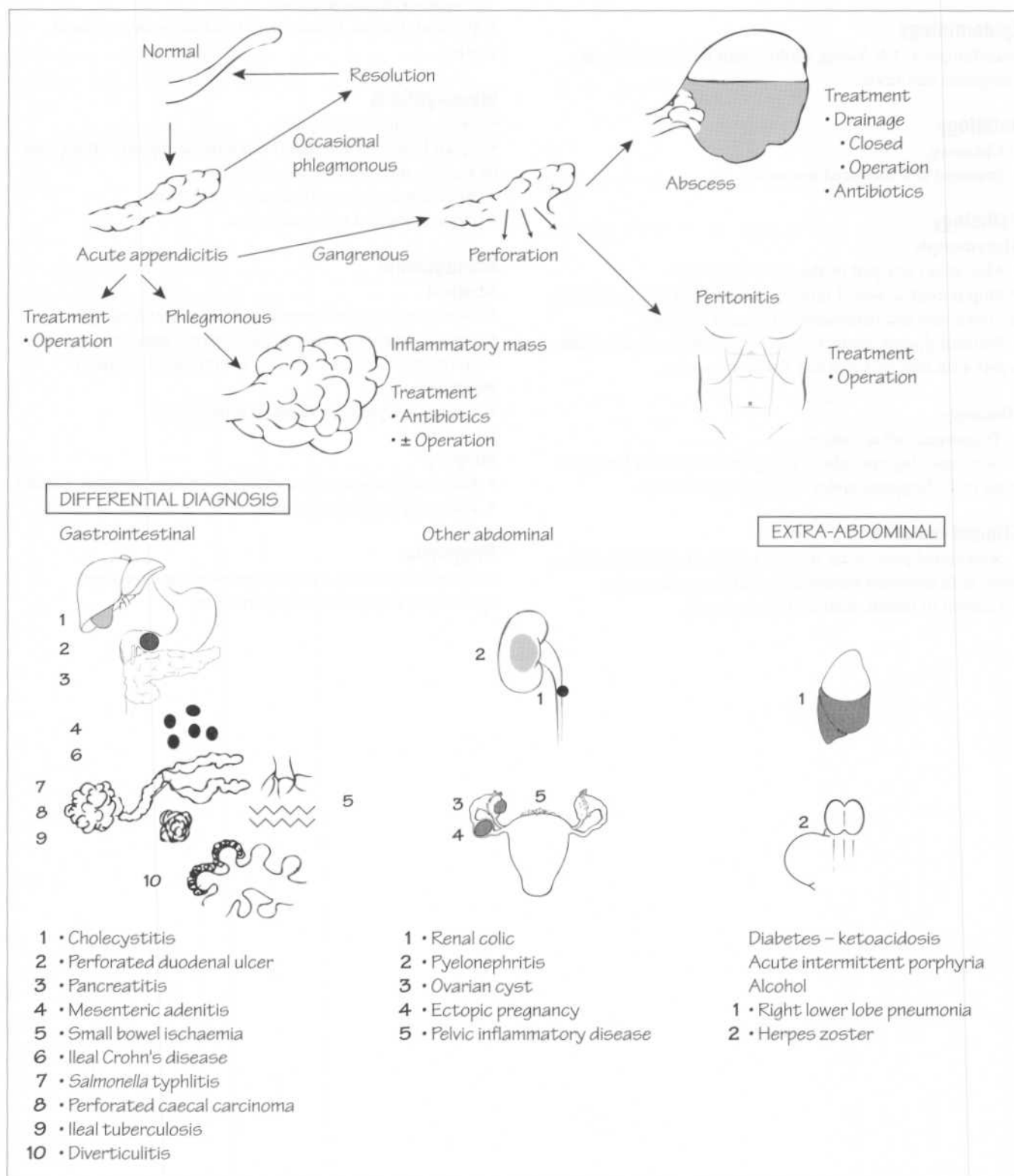
Surgery

- For complications (peritonitis, obstruction, abscess, fistula).
- Failure of medical treatment.

Prognosis

- Crohn's disease is a chronic problem, and recurrent episodes of active disease are common.

37 Acute appendicitis



Definition

Acute appendicitis is an inflammation of the vermiform appendix.

Epidemiology

Commonest surgical emergency in the Western World. Rare under 2 years, common in second and third decades, but can occur at any age.

Pathology

- Infection superimposed on luminal obstruction from any cause.
- Viral infection, lymphoid hyperplasia, ulceration, bacterial invasion, appendicitis.

Clinical features

- Periumbilical abdominal pain, nausea, vomiting.
- Localization of pain to RIF.
- Mild pyrexia.
- Patient is flushed, tachycardia, furred tongue, halitosis.
- Tender (usually with rebound) over McBurney's point.
- Right-sided pelvic tenderness on PR examination.
- Peritonitis if appendix perforated.
- Appendix mass if patient presents late.

Investigations

- Diagnosis is a clinical diagnosis, but WCC (almost always leucocytosis) and CRP (usually raised) are helpful.

- Ultrasound for appendix mass and if in doubt to rule out other pelvic pathology (e.g. ovarian cyst).

Differential diagnosis

- Mesenteric lymphadenitis in children.
- Pelvic disease in women (e.g. pelvic inflammatory disease, urinary tract infections, ectopic pregnancy, ruptured corpus luteum cyst).
- More rarely: Crohn's disease, cholecystitis, perforated duodenal ulcer, right basal pneumonia, torsion of the right testis, diabetes mellitus.

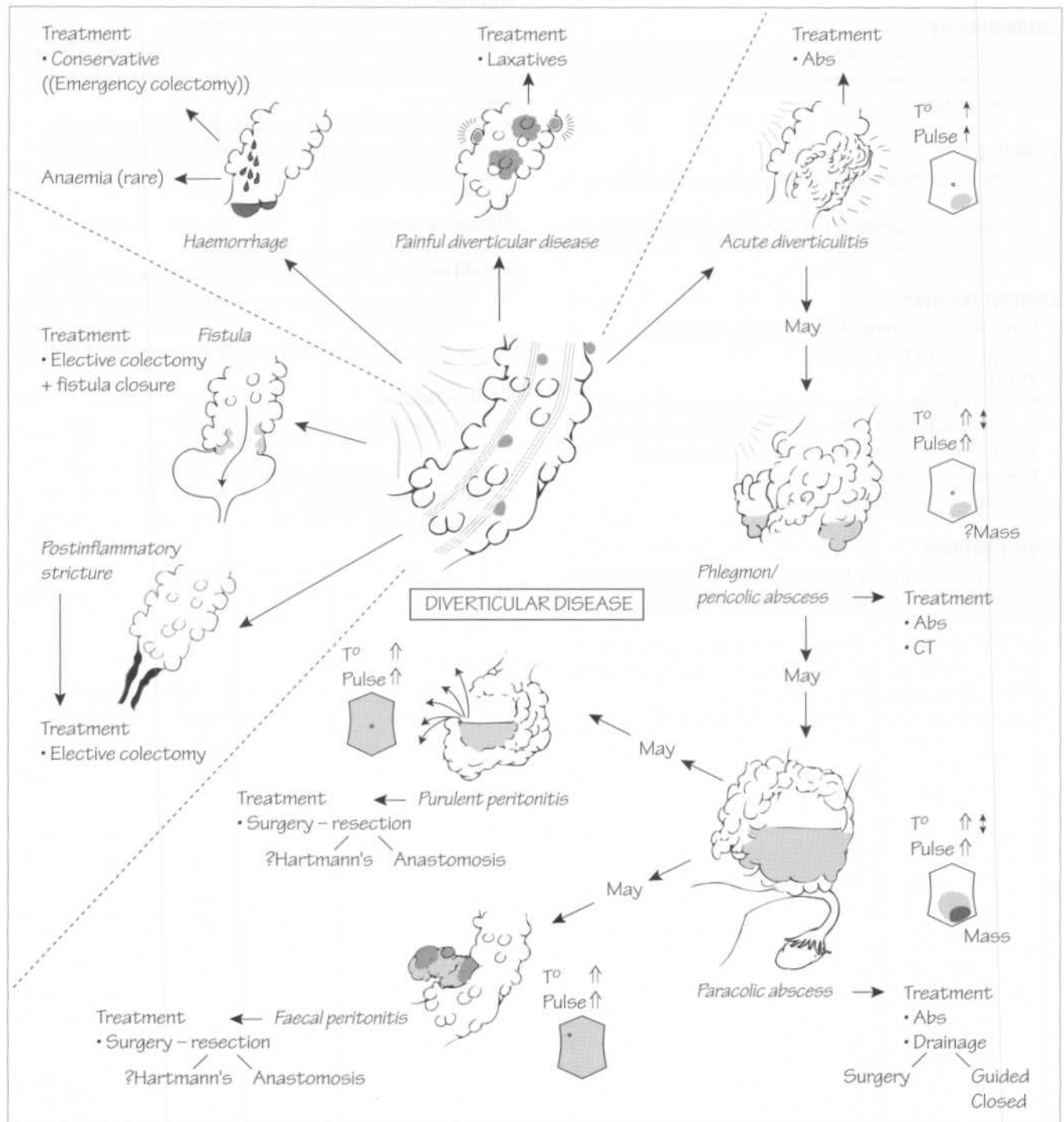
Management

- Acute appendicitis: appendicectomy.
- Appendix mass: i.v. fluids, antibiotics, close observation.
 - If symptoms resolve: interval appendicectomy after a few months.
 - If symptoms progress: urgent appendicectomy ± drainage.

Complications

- Wound infection.
- Adhesions.
- Abdominal actinomycosis (rare!).
- Intra-abdominal abscess.
- Portal pyaemia.

38 Diverticular disease



Definition

Diverticular disease (or *diverticulosis*) is a condition in which many sac-like mucosal projections (diverticula) develop in the large bowel especially the sigmoid colon. Acute inflammation of a diverticulum causes *diverticulitis*.

Epidemiology

Male/female 1 : 1.5. Age 40s and 50s onwards. High incidence in the Western World where it is found in 50% of people over 60 years.

Aetiology

- Low fibre in the diet causes an increase in intraluminal colonic pressure resulting in herniation of the mucosa through the muscle coats of the wall of the colon.
- Weak areas in wall of colon where nutrient arteries penetrate to submucosa and mucosa.

Pathology

Macroscopic

- Diverticula mostly found in (thickened) sigmoid colon.
- Emerge between the taenia coli and may contain faecaliths.

Histology

- Projections are *pseudodiverticulae* as they contain only submucosa and mucosa and not all layers of intestinal wall.

Clinical features

- Mostly asymptomatic.
- Painful diverticulosis: LIF pain, constipation, diarrhoea.
- Acute diverticulitis: malaise, fever, LIF pain and tenderness ± palpable mass and abdominal distension.
- Perforation: peritonitis + features of diverticulitis.

- Large bowel obstruction: absolute constipation, distension, colicky abdominal pain and vomiting.
- Fistula: to bladder (cystitis/pneumaturia); to vagina (faecal discharge PV); to small intestine (diarrhoea).
- Lower GI bleed: distinguish from angiodysplasia.

Investigations

- Diverticulosis: barium enema/colonoscopy.
- Diverticulitis: FBC, WCC, U+E, chest X-ray.
- Perforation: plain film of abdomen.
- Obstruction: gastrograffin or dilute barium enema.
- Fistula: MSU, cystoscopy, colposcopy.
- Haemorrhage: colonoscopy, selective angiography.

Management

Medical

- High-fibre diet (fruit, vegetables, wholemeal breads, bran).

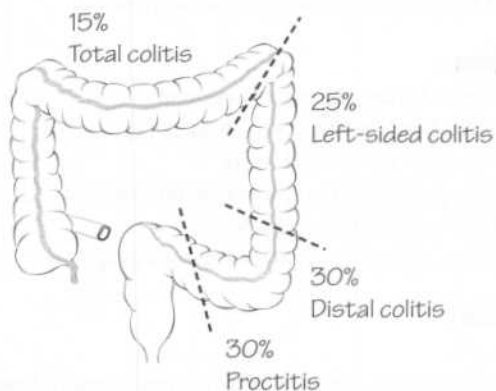
Surgical

- Usually for complications or rarely failed medical treatment.
- Elective left colon surgery without peritonitis: resect diseased colon and rejoin the ends (primary anastomosis).
- Emergency left colon surgery with peritonitis: resect diseased segment, oversew distal bowel (i.e. upper rectum) and bring out proximal bowel as end-colostomy (Hartmann's procedure).
- Complicated left colon surgery (e.g. colovesical fistula): resection, primary anastomosis, defunctioning proximal colostomy.

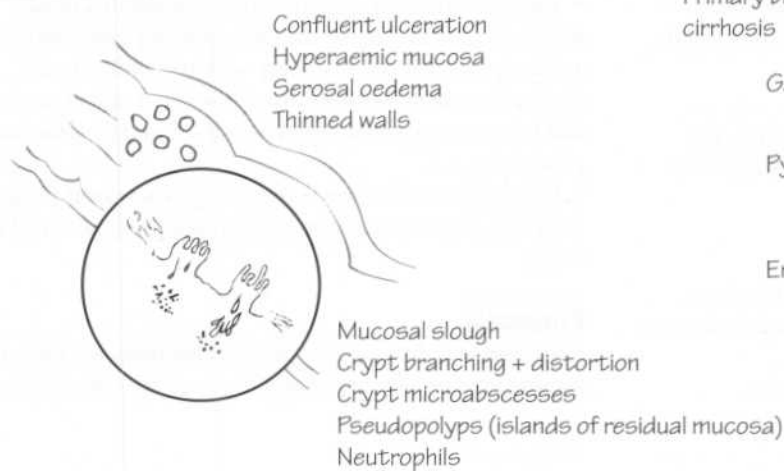
Prognosis

- Diverticular disease is a 'benign' condition, but there is significant mortality and morbidity from the complications.

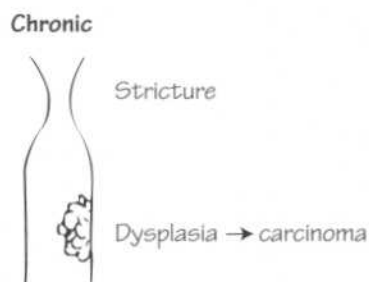
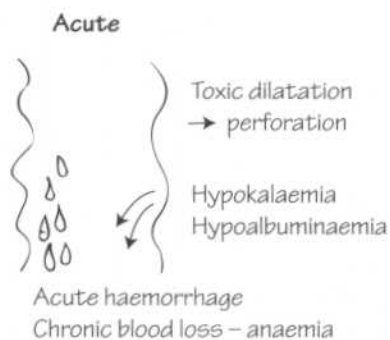
39 Ulcerative colitis



FEATURES



COMPLICATIONS



EXTRA-INTESTINAL MANIFESTATIONS

Iritis
Conjunctivitis
Scleritis



Seronegative
arthritis



Ankylosing spondylitis



Chronic active
hepatitis



Primary biliary
cirrhosis

Gallstones

Pyoderma gangrenosum

Erythema nodosum



Definition

Ulcerative colitis is a chronic inflammatory disorder of the colon, beginning in the rectum and extending proximally to a variable extent.

Epidemiology

Male/female 1:1.6. Age 30–50 years. High incidence among relatives of patients (up to 40%) and among Europeans and Jews.

Aetiology

- Genetic origin: increased prevalence (10%) in relatives, associated with HLA-B27 phenotype.
- May have autoimmune basis.

Pathology

Macroscopic

- Disease confined to colon, rectum always involved, may be 'backwash' ileitis.
- Only the mucosa is involved with superficial ulceration, exudation and pseudopolyposis.

Histology

- Crypt abscess, inflammatory polyps and highly vascular granulation tissue. Epithelial dysplasia with long-standing disease.

Clinical features

Mild or moderate disease

- Diarrhoea, passage of mucus, pus and blood PR.
- Abdominal pain, anorexia, weight loss and anaemia.
- Extra-intestinal features (percentage involved):
 - joints: arthritis (25%);
 - eye: uveitis (10%);
 - skin: erythema nodosum, pyoderma gangrenosum (10%);
 - liver: pericholangitis, fatty liver (3%);
 - blood: thromboembolic disease.

Severe/fulminant disease

- Six to 20 bloody bowel motions per day.
- Fever, anaemia, dehydration, electrolyte imbalance.
- Colonic dilatation/rupture — *toxic megacolon*.

Investigations

- FBC: iron deficiency anaemia.
- Barium enema: loss of haustrations, shortened lead pipe colon.
- Sigmoidoscopy: inflamed friable mucosa, bleeds to touch.
- Biopsy: typical histological features.
- Plain abdominal radiograph: colonic dilatation or air under diaphragm indicating perforation in toxic megacolon.

Management

Medical

- High-fibre diet, antidiarrhoeal agents (codeine phosphate).
- Anti-inflammatory drugs (Salazopyrin, steroids).
- Steroid enemas if disease confined to rectum.
- Immunosuppressive agents (azathioprine) occasionally.

Surgery

Indications

- Failure of medical treatment.
- Complications: profuse haemorrhage, perforation/toxic megacolon, risk of cancer (greater with longer disease, more aggressive onset and more extensive disease).

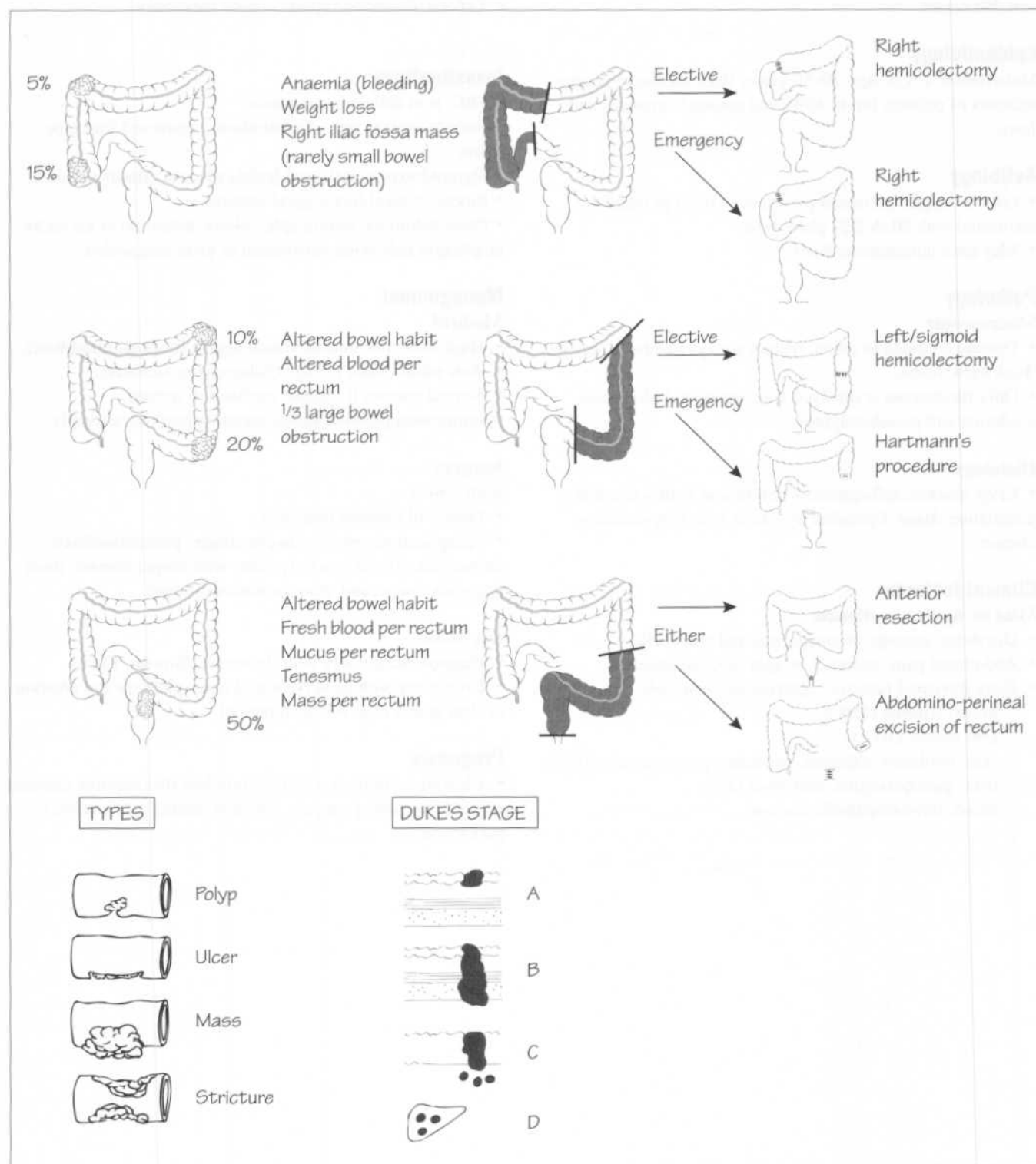
Operations

- Panproctocolectomy with ileostomy (Brooke, Koch).
- Colectomy with preservation of anal sphincter and creation of ileal pouch (e.g. J-shaped pouch).

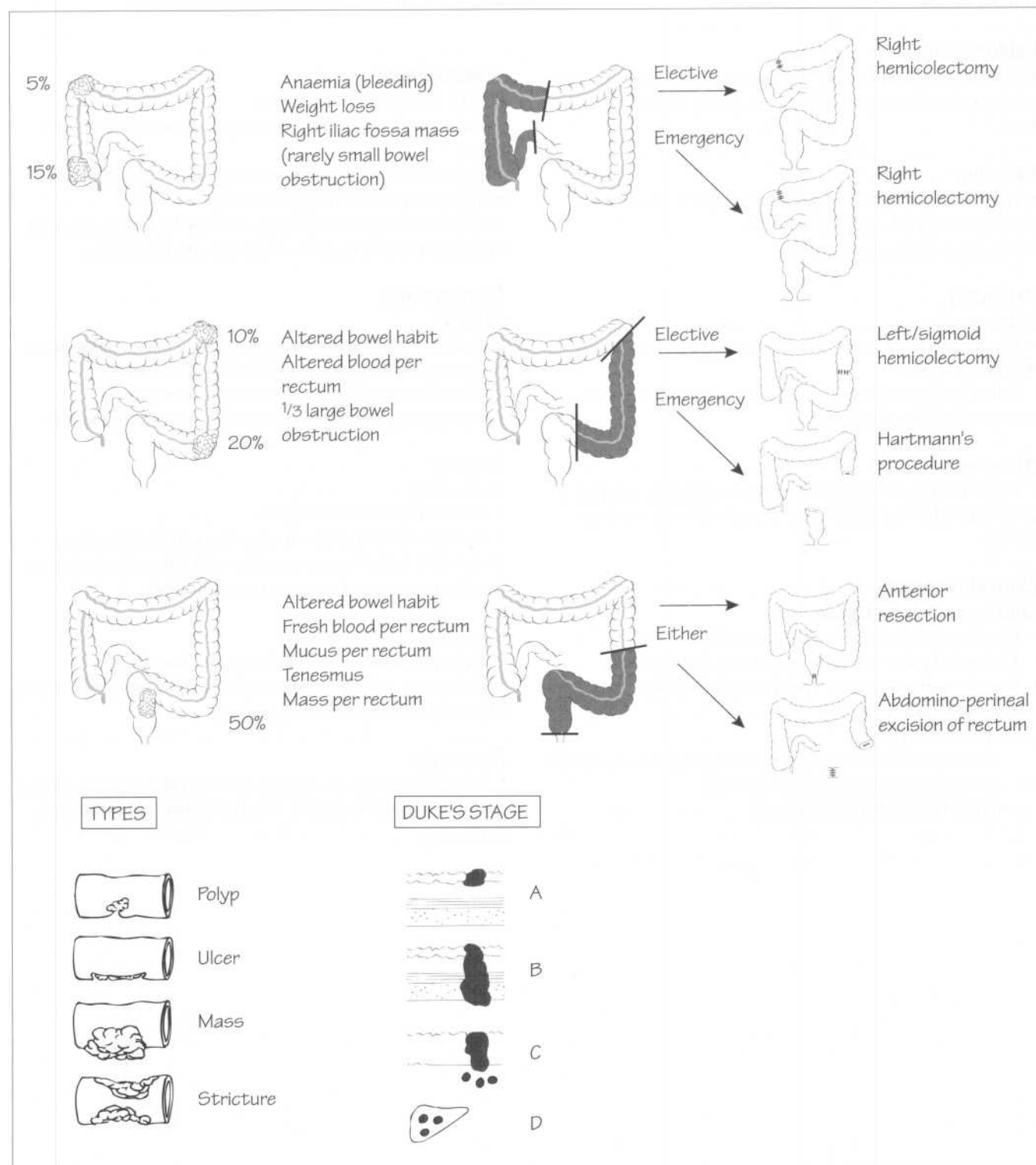
Prognosis

- Ulcerative colitis is a chronic problem that requires constant surveillance unless surgery, which is drastic but curative, is performed.

40 Colorectal carcinoma



40 Colorectal carcinoma



Definition

Malignant lesions occurring in the rectum and colon.

Epidemiology

Male/female 1.3 : 1. Age 50+ years. Incidence has increased in Western World over last 50 years.

Aetiology

The following are predisposing factors.

- Diet (low in indigestible fibre, high in animal fat).
- A prior colorectal cancer.
- Ulcerative colitis.
- Increased faecal bile salts.
- Selenium deficiency.
- Adenomatous polyps.
- Hereditary polyposis coli.
- High anaerobic bacterial count in faeces.

Pathology

Macroscopic

- Polypoid, ulcerating, annular, infiltrative.
- 75% of lesions are within 60 cm of the anal margin.
- 3% are synchronous (i.e. a second lesion will be found at the same time) and 3% are metachronous (i.e. a second lesion will be found later).

Histology

- Adenocarcinoma (10–15% are mucinous adenocarcinoma).
- Staging by Duke's classification:

A confined to mucosa	B ₁ muscle wall but not serosa
B ₂ involves serosa	C ₁ muscle wall + lymph nodes
C ₂ serosa + lymph nodes	D distant metastases
- Spread—lymphatic, haematogenous (via veins to liver), peritoneal.

Clinical features

- Anaemia—caecal cancers often present with anaemia.
- Colicky abdominal pain—tumours which are causing partial obstruction, e.g. transverse or descending colonic lesions.

- Alteration in bowel habit—either constipation or diarrhoea.
- Bleeding or passage of mucus PR.
- Tenesmus (frequent or continuous desire to defaecate)—rectal lesions.

Investigations

- Digital rectal examination.
- FBC.
- U + E.
- Faecal occult blood.
- Sigmoidoscopy (rigid to 30 cm/flexible to 60 cm) and colonoscopy (whole colon); see the lesion, obtain biopsy.
- Double-contrast barium enema—'apple core lesion', polyp.
- CEA is usually raised in advanced disease.

Management

Surgery

- Resection of the tumour with adequate margins and regional lymph nodes.
- Procedures.
 - Right hemicolectomy (no bowel prep.) for lesions from caecum to splenic flexure.
 - Left hemicolectomy (bowel prep.) for lesions of descending and sigmoid colon.
 - Low anterior resection for rectal tumours.
 - Abdomino-perineal resection and colostomy for very low rectal lesions.
 - Hartmann's procedure for emergency surgery to left colon.

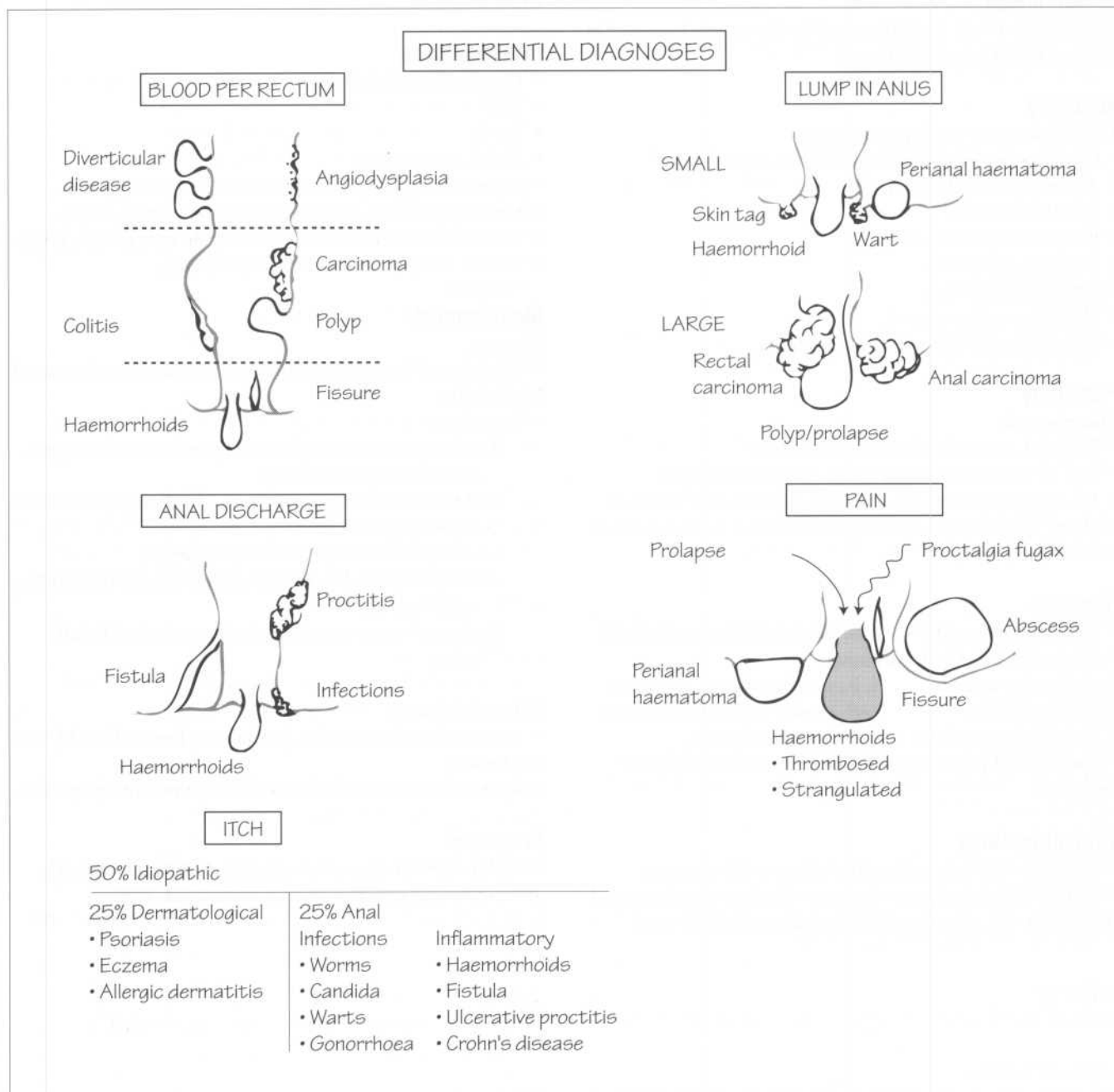
Other treatment

- Adjunct chemotherapy for patient with Duke's C (5-FU and levamisole).
- Resection for liver metastases if fewer than five are present.

Prognosis

- 5-year survival depends on staging: A, 80%; B, 60%; C, 35%; following resection of liver metastases, 25%.

41 Benign anal and perianal disorders



Haemorrhoids

Definition

A haemorrhoid (pile) is a submucosal swelling in the anal canal that consists of a venous plexus, a small artery and areolar tissue.

Aetiology

- Haemorrhoids are caused by increased venous pressure from straining (low-fibre diets) or altered haemodynamics (e.g. during pregnancy).

- They are found at the 3, 7 and 11 o'clock positions in the anal canal.

Clinical features

- First degree (1°): bleeding/itching only.
- Second degree (2°): prolapse during defaecation.
- Third degree (3°): constantly prolapsed.

Treatment

- 1°: bulk laxatives and high-fibre diet, injection sclerotherapy.
- 2°: injection sclerotherapy, Barron's bands, cryosurgery.
- 3°: haemorrhoidectomy (complications: bleeding, anal stenosis).

Rectal prolapse

Definition

Condition characterized by protrusion to a variable degree of the rectal mucous membrane from the anus.

Aetiology

Precipitating factors: rectal intussusception and poor sphincter tone.

Clinical features

Mucous discharge, bleeding, obvious prolapse.

Treatment

Well's rectopexy (rectum is 'hitched' up onto sacrum and held in place with an Ivalon sponge).

Perianal haematoma

Definition

Very painful subcutaneous haematoma caused by rupture of small blood vessel in the perianal area. Evacuation of the clot provides instant relief.

Anal fissure

Definition

Longitudinal tear in the mucosa of the anal canal, in the midline posteriorly (90%) or anteriorly (10%).

Aetiology

Caused by local trauma during passage of constipated stool.

Clinical features

Exquisitely painful on passing bowel motion, small amount of bright red blood on toilet tissue, severe sphincter spasm, skin tag at distal end of tear (sentinel pile).

Treatment

Lateral sphincterotomy, anal dilatation (Lord's procedure) under GA.

Perianal infections

Definition

Bacterial infections presenting as abscesses in the perianal region.

Aetiology

Focus of infection starts in anal glands and spreads to cause:

- perianal abscess: adjacent to anal margin;
- ischiorectal abscess: in ischiorectal fossa;
- para-rectal abscess: above levator ani.

Clinical features

Painful, red, tender, swollen mass ± constitutional symptoms.

Treatment

Incision and drainage, antibiotics.

Fistula in ano

Definition

Abnormal communication between the skin in the perianal region and the anal canal.

Aetiology

Track connecting skin and anal canal becomes established and persists following drainage of a perianal abscess. May be associated with Crohn's disease (multiple fistulae), ulcerative colitis or TB.

Clinical features

Chronic perianal discharge, external orifice of track with granulation tissue is easily seen perianally.

Treatment

Probing and laying open the track. Complex high fistulae may need colostomy and a seton.

Pilonidal sinus

Definition

A blind-ending track containing hairs in the skin of the natal cleft.

Aetiology

Movement of buttocks promotes hair migration into a (?congenital) sinus.

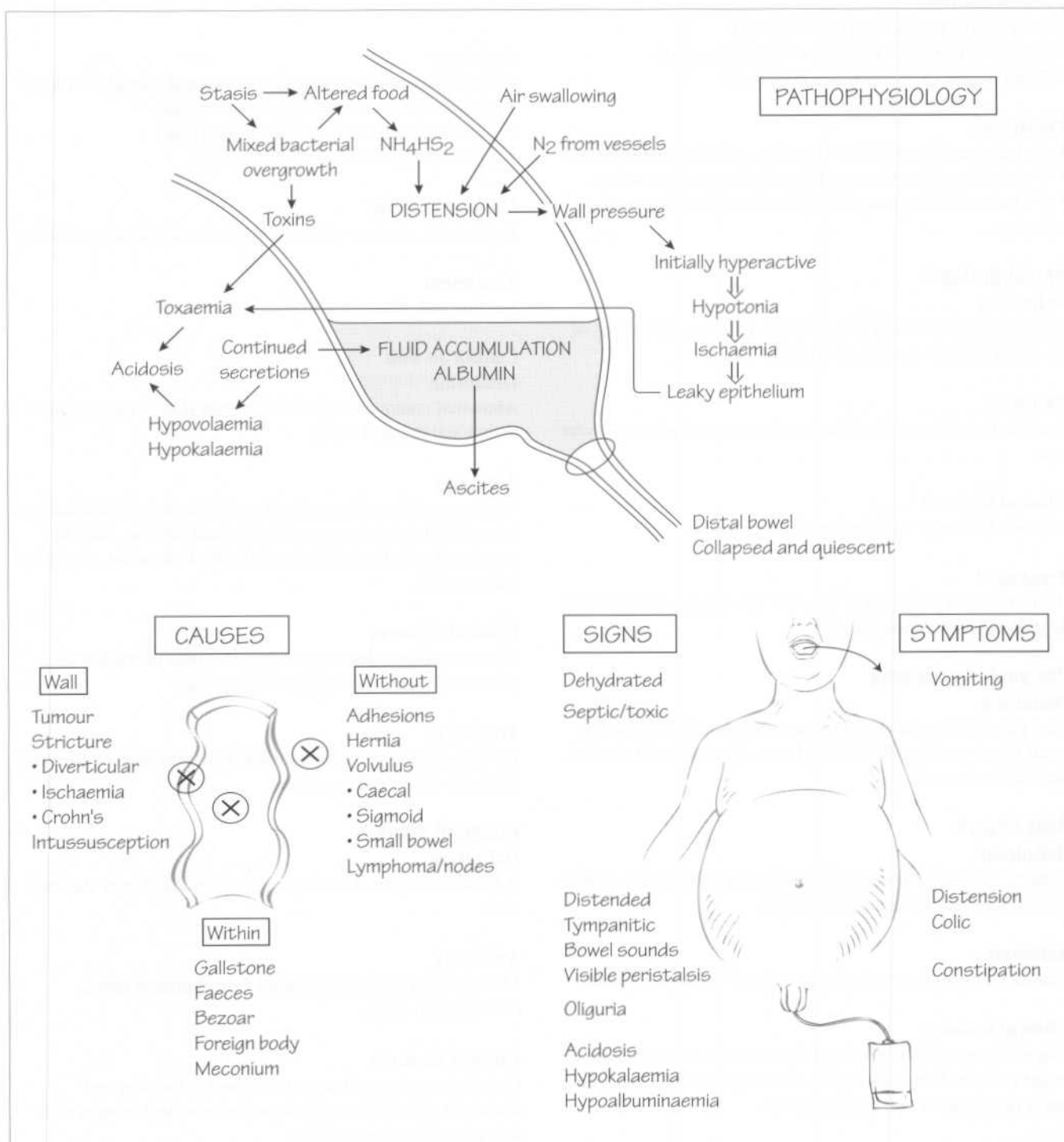
Clinical features

Usually presents as abscess (treatment is incision and drainage). Sinus is in midline posterior to anal margin with hair protruding from orifice.

Treatment

Good personal hygiene. Excision of sinus network may be required.

42 Intestinal obstruction



Definitions

Complete intestinal obstruction indicates total blockage of the intestinal lumen, whereas *incomplete* denotes only a partial blockage. Obstruction may be *acute* (hours) or *chronic* (weeks), *simple (mechanical)*, i.e. blood supply is not compromised, or *strangulated*, i.e. blood supply is compromised. A *closed loop obstruction* is an obstruction of the colon in the presence of a competent ileocaecal valve.

Common causes

- Extramural: adhesions, bands, volvulus, hernias (internal and external), compression by tumour (e.g. frozen pelvis).
- Intramural: inflammatory bowel disease (Crohn's disease), tumours, carcinomas, lymphomas, strictures, paralytic (adynamic) ileus, intussusception.
- Intraluminal: faecal impaction, foreign bodies, bezoars, gallstone ileus.

Pathophysiology

- Bowel distal to obstruction collapses.
- Bowel proximal to obstruction distends and becomes hyperactive. Distension is due to swallowed air and accumulating intestinal secretions.
- The bowel wall becomes oedematous. Fluid and electrolytes accumulate in the wall and lumen (third space loss).
- Bacteria proliferate in the obstructed bowel.
- As the bowel distends, the intramural vessels become stretched and the blood supply is compromised leading to ischaemia and necrosis.

Clinical features

- Vomiting, colicky abdominal pain, abdominal distension, absolute constipation (i.e. neither faeces nor flatus).
- Dehydration and loss of skin turgor.
- Hypotension, tachycardia.
- Abdominal distension and increased bowel sounds.
- Empty rectum on digital examination.
- Tenderness or rebound indicates peritonitis.

Investigations

- Hb, PCV: elevated due to dehydration.
- WCC: normal or slightly elevated.
- U + E: urea elevated, Na^+ and Cl^- low.
- Chest X-ray: elevated diaphragm due to abdominal distension.
- Abdominal X-rays: erect film demonstrates air/fluid levels, supine film gives clue as to whether obstruction is in small (central distension/valvulae conniventes shadows cross entire width of lumen) or large (peripheral distension/haustral shadows do not cross entire width of bowel) bowel.
- Contrast studies, sigmoidoscopy to show site of obstruction.

Management

- Decompress the obstructed gut: pass naso-gastric tube.
- Replace fluid and electrolyte losses: give Ringer's lactate or NaCl with K^+ supplementation.
- Relieve the obstruction surgically if:
 - underlying causes need surgical treatment (e.g. hernia, colonic carcinoma);
 - patient does not improve with conservative treatment (e.g. adhesion obstruction);
 - there are signs of strangulation or peritonitis.

43 Abdominal hernias

TYPES



Gluteal (GSF)
Sciatic (LSF)



Inguinal
Femoral

Obturator

Epigastric
(Para)umbilical
Spigelian



Lumbar

SORTS



Reducible



Irreducible



Strangulated



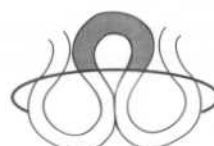
Sliding
(Retroperitoneal
contents in sac)



Littre's
(Meckel's diverticulum
content)



Richter's
(Strangulated
unobstructed)



Maydl's
(Strangulated
above defect)



Prevascular
(Femoral)

PRINCIPLES OF REPAIR

1 Identify anatomy



Inguinal

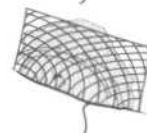


Femoral

2 Isolate sac
Reduce contents
Remove sac



3 Repair defect



Mesh repair
(Lichtenstein)



Plication darn
(Shouldice)



Definition

A hernia is the protrusion of a viscus or part of a viscus through an abnormal opening.

Types

- Umbilical.
- Para-umbilical.
- Epigastric.
- Inguinal (direct and indirect).
- Femoral.
- Incisional.

Pathophysiology

- The defect in the abdominal wall may be congenital (e.g. femoral canal) or acquired (e.g. an incision) and is lined with peritoneum (the sac).
- Raised intra-abdominal pressure further weakens the defect allowing some of the intra-abdominal contents (e.g. omentum, small bowel loop) to migrate through the opening.
- Entrapment of the contents in the sac leads to incarceration (unable to reduce contents) and strangulation (blood supply to incarcerated contents is compromised).

Clinical features

- Patient presents with a lump over the site of the hernia:

femoral hernias are below and lateral to the pubic tubercle; inguinal hernias are above and medial to the pubic tubercle;

indirect inguinal hernias can be controlled by digital pressure over the internal inguinal ring;

direct inguinal hernias protrude through Hasselbach's triangle (inguinal ligament, lateral border of rectus, inferior epigastric artery);

incisional hernias bulge on tensing the recti.

- Patient may present with a complication (incarceration, intestinal obstruction, strangulation).

Management

- Surgical repair should be undertaken unless patient is very unfit.
- Herniotomy: excision of the hernial sac.
- Herniorrhaphy: repairing the defect.

Complications of surgery

- Haematoma (wound or scrotal).
- Acute urinary retention.
- Wound infection.
- Chronic pain.
- Testicular pain and swelling leading to testicular atrophy.
- Hernia recurrence (about 5%).

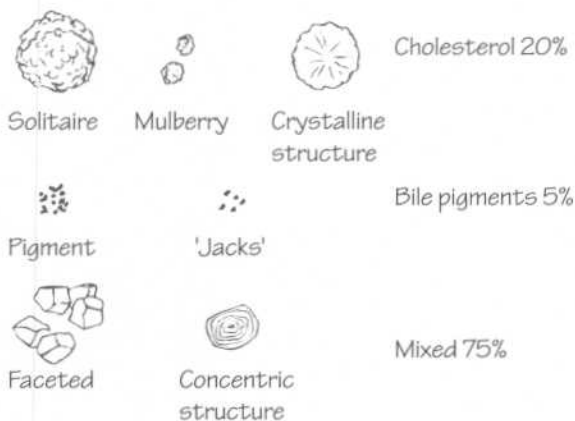
44 Gallstone disease/1

	Causes and symptoms	Cardinal symptoms and signs	Structure involved (diagnosis)		
			Gallbladder	CBD	Other
A	Presence of stone → Irritation → Contraction	Pain Nausea Vomiting Tender RUQ	Biliary colic ↓ May	Biliary (ductal) colic ↓ May	—
B	Obstruction of structure (simple)	As above + • Persistence of pain etc. • Mass RUQ (jaundice)	Mucocele ↓ May	Obstructive jaundice ↓ May	—
C	Obstruction of structure (+ infection)	As above + • Swinging fever • Tachycardia • Neutrophilia • Rigors	Empyema ↓ May perforate Biliary peritonitis	Cholangitis	—
D	Inflammation/infection	As for A + • Fever • Tachycardia • Neutrophilia	Cholecystitis	(Cholangitis)	Pancreatitis

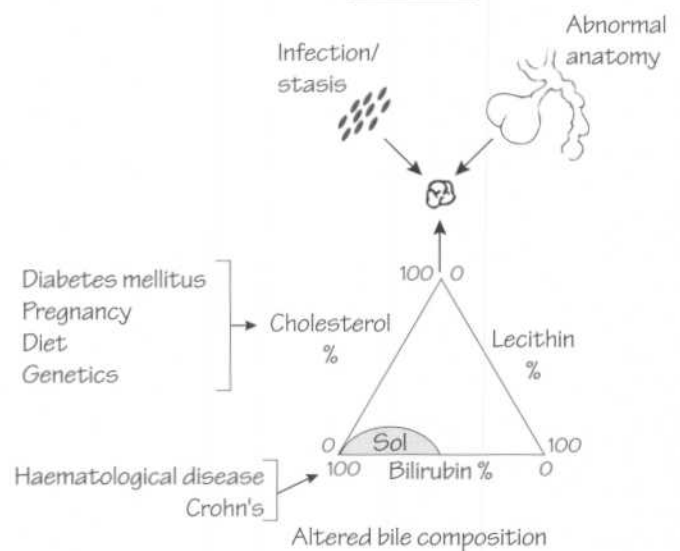
Other conditions associated with gallstones

- Gallstone ileus
- Adenocarcinoma gallbladder

TYPES OF GALLSTONES



CAUSES



Definition

Gallstones are round, oval or faceted concretions found in the biliary tract. They contain, singly or in combination, cholesterol, calcium carbonate or calcium bilirubinate.

Epidemiology

Male/female 1 : 2. Age 40s onwards. High incidence of mixed stones in Western World. Pigment stones commoner in the East.

Pathogenesis

- Cholesterol stones: imbalance in bile between cholesterol, bile salts and phospholipids producing lithogenic bile.
- Bilirubinate stones: chronic haemolysis, infection with β -glucuronidase-producing bacteria.

Pathology

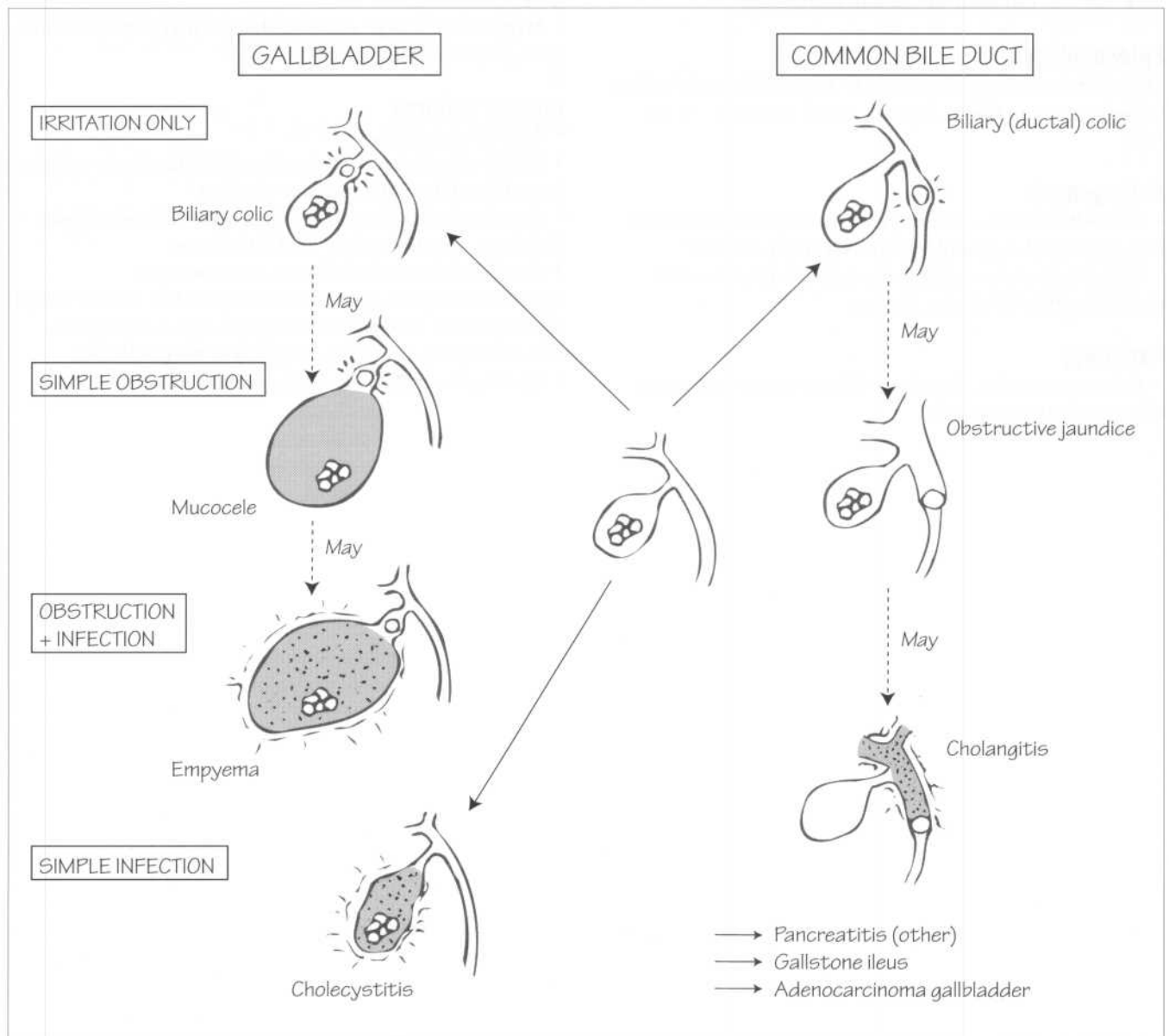
- Gallstones passing through the biliary system may cause biliary colic or pancreatitis.

- Stone obstruction at the gallbladder neck with superimposed infection leads to cholecystitis.
- Obstruction of the CBD with superimposed infection leads to septic cholangitis.
- Migration of a large stone into the gut may cause intestinal obstruction (gallstone ileus).

Clinical features

- May be asymptomatic.
- Biliary colic: severe colicky upper abdominal pain radiating around the right costal margin $\pm$ vomiting.
- Chronic cholecystitis: vague right upper abdominal pain, distension, flatulence, fatty food intolerance.
- Acute obstructive cholecystitis: constant right hypochondrial pain, pyrexia, nausea $\pm$ jaundice. Tender in right upper quadrant with positive Murphy's sign. Leucocytosis. Unresolved may lead to an empyema of the gallbladder.
- Cholangitis: high fever, rigors, jaundice (Charcot's triad).

Gallstone disease/2



Investigations

- 90% of gallstones will be detected on ultrasound examination.
- Rarely are other investigations, such as oral cholecystography, intravenous cholangiography or HIDA scanning, required.
- Plain X-ray of the abdomen shows only 10% of gallstones.
- FBC.
- U+E.
- LFT.

Management

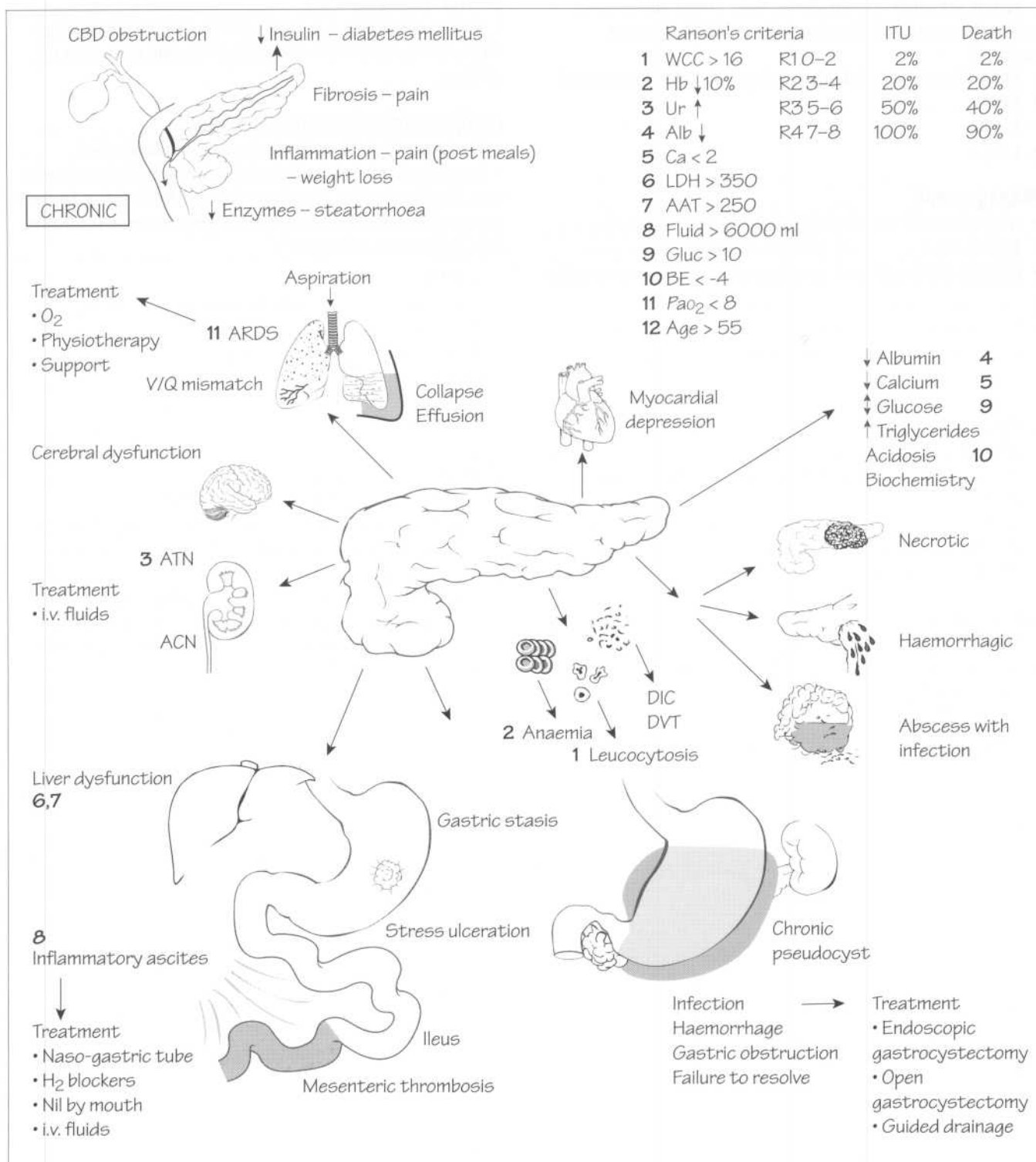
- Asymptomatic: no treatment required unless diabetic.
 - Biliary colic
 - Chronic cholecystitis
- } Elective cholecystectomy, now usually performed laparoscopically

- Acute cholecystitis: intravenous fluids, antibiotics, interval cholecystectomy.
- Empyema: percutaneous drainage of the gallbladder and interval cholecystectomy.
- Septic cholangitis: i.v. fluids, antibiotics, ductal drainage (now usually by ERCP), sphincterotomy and extraction of stones.

Complications of cholecystectomy

- Leakage of bile from cystic duct or gallbladder bed.
- Jaundice due to retained ductal stones or injury to the bile duct. Retained stones can be treated by ERCP or if a T-tube is in place by extraction with a Dormia basket down the T-tube track (Burhenne manoeuvre).

45 Pancreatitis



Definition

Pancreatitis is an inflammatory condition of the exocrine pancreas that results from injury to the acinar cells. It may be acute or chronic.

Aetiology

Gallstones and alcohol abuse account for 95% of cases of acute pancreatitis.

Pathology

- Acinar cell injury allows pancreatic digestive enzymes to be released into the bloodstream and peritoneal cavity. The severity of injury varies from mild oedema to a severe haemorrhagic inflammation and necrosis.
- An accumulation of pancreatic fluid in the lesser sac is a pseudocyst, i.e. does not have an epithelial lining.
- Recurrent episodes of acute inflammation lead to progressive destruction of acinar cells with healing by fibrosis (chronic pancreatitis).

Clinical features

- Mild/moderate pancreatitis: constant upper abdominal pain radiating to back, nausea, vomiting, pyrexia, tachycardia $\pm$ jaundice.
- Severe/necrotizing pancreatitis: severe upper abdominal pain, signs of hypovolaemic shock, respiratory and renal impairment, silent abdomen, Grey Turner's and Cullen's signs.

Management

- Confirm diagnosis: serum amylase > 1000 iu.
- Assess disease severity (Imrie/Ranson criteria).

Hypotension	
Age > 55	Respiratory difficulty
WCC $> 16\,000$	$PaO_2 < 7.98$ kPa

Blood glucose > 11.2 mmol/l Serum LDH > 350 iu/l

SGOT > 250 iu/l

PCV fall $> 10\%$

Blood urea > 1.8 mmol/l

Serum calcium < 2.0 mmol/l

- Mild/moderate disease: i.v. fluids, analgesia, monitor progress with pulse, BP, temperature. No need for naso-gastric tube or antibiotics. Establish the cause: gallstones, treatment by cholecystectomy; alcohol, treatment by avoiding further exposure.
- Severe pancreatitis: full resuscitation in ICU with invasive monitoring. Patient may need laparotomy for debridement of necrotic pancreas.

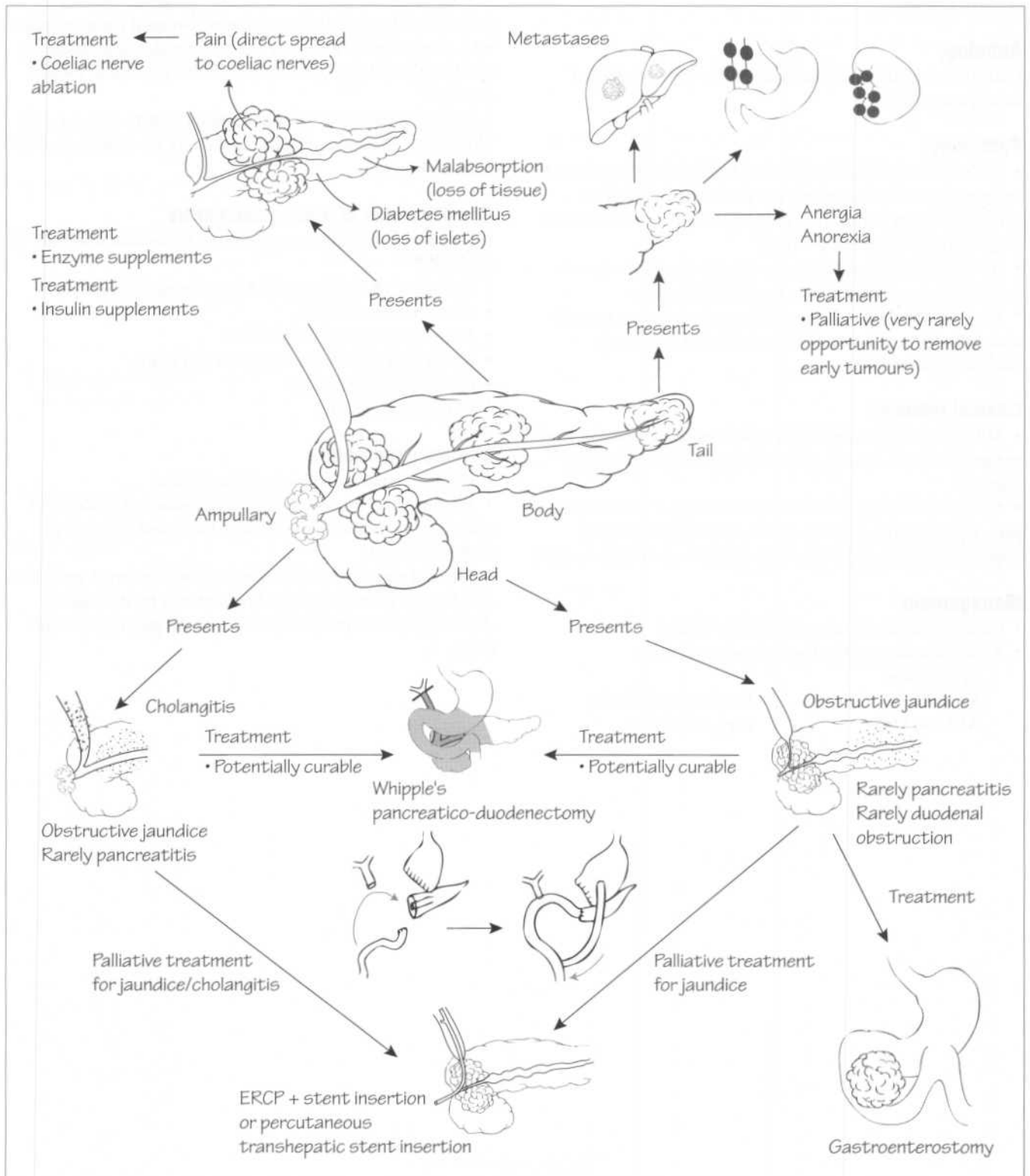
Complications of acute pancreatitis

- Pseudocyst formation: may need to be drained internally or externally.
- Pancreatic abscess: usually necrotic pancreas present.
- Intra-abdominal sepsis.
- Necrosis of the transverse colon.
- Respiratory (ARDS) or renal (ATN) failure.
- Pancreatic haemorrhage.
- Chronic pancreatitis.

Chronic pancreatitis

- Usually caused by chronic alcohol abuse.
- Presents with intractable abdominal pain and evidence of exocrine pancreatic failure (steatorrhoea) and eventually diabetes as well.
- Medical treatment is with analgesia and exocrine pancreatic enzyme replacement. Surgical treatment is by drainage of dilated pancreatic ducts or excision of the pancreas in some cases.

46 Pancreatic tumours



Definitions

Pancreatic ductal carcinoma is a malignant lesion of the head or body of the pancreas. *Periampullary carcinomas* arise around the ampulla of Vater and include tumours arising from the pancreas, duodenum, distal bile duct and the ampulla itself. *Endocrine pancreatic tumours* cause a variety of syndromes secondary to the secretion of active peptides.

Epidemiology

Male/female 2 : 1. Age 50–70 years. Incidence of pancreatic carcinoma is increasing in the Western World.

Aetiology

The following are predisposing factors.

- Smoking.
- Diabetes.
- Chronic pancreatitis.

Pathology

- Site: 60% involve head of pancreas, 25% body, 15% tail.
- Macroscopic: growth is hard and infiltrating.
- Histology: adenocarcinoma.
- Spread: lymphatics to peritoneum and regional nodes, via bloodstream to liver and lung. Metastases often present at time of diagnosis.

Clinical features

- Back pain, anorexia, weight loss.
- Progressive jaundice (Courvoisier's law: a palpable gall-bladder in the presence of jaundice is unlikely to be due to gallstones).
- Duodenal obstruction causing vomiting.
- Malignant ascites.

Investigations

- Ultrasound: may see mass in head of pancreas and distended biliary tree, facilitates needle biopsy.
- CT scan: demonstrates tumour mass, facilitates biopsy.
- ERCP: very accurate in making diagnosis; obtain specimen for cytology, and stent may be placed to relieve jaundice.
- Barium meal: widening of the duodenal loop with medial filling defect, the reversed '3' sign.

Management

Palliation

- Pancreatic adenocarcinoma is usually incurable at time of diagnosis.
- Jaundice is relieved by placing a stent through the tumour either transhepatically or via ERCP.
- Duodenal obstruction is relieved by gastrojejunostomy.
- Pain may be helped with a coeliac axis block.

Curative treatment

- Rarely surgical (Whipple's) resection of small tumours of the head of the pancreas is curative if lymph nodes are not involved.

Prognosis

- 90% of patients with pancreatic adenocarcinoma are dead within 12 months.
- It is important to obtain histology from tumours around the head of the pancreas as the prognosis from *non-pancreatic* periampullary cancers is considerably better (50% 5-year survival) following resection.

47 Benign breast disease

CAUSES OF GYNAECOMASTIA

Hormones

Teratoma	- β -HCG
Adrenal tumour	- E_2
Acromegaly	- GH
Prolactinoma	- Prolactin
Cushing's	- Cortisol



Drugs

Oestrogenic	Anti-androgens	Cytotoxics
• Digoxin	• Cyproterone	• Vincristine
• Cannabis	• Cimetidine	
• Diamorphine	• Spironolactone	

Metabolic

Thyroid
• Hyper T₄



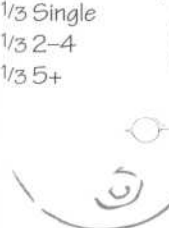
Kidney
• CRF



Liver
• Primary biliary cirrhosis
• Cirrhosis
• Alcohol

FEATURES OF FIBROADENOSIS AND RELATIONSHIP TO PRESENTATIONS

Breast cysts
(Single or multiple)
(‘Cystic mastopathy’)
1/3 Single
1/3 2-4
1/3 5+



Cyclical painful breasts
(mastalgia)



Single breast lump

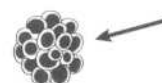


Generalized ‘lumpy’ breast



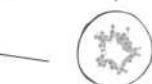
Nipple discharge

Cyst formation



Lymphocytic infiltration

Fibroadenosis



Ductal epitheliosis

Adenosis



Fibrosis



‘Radial scar’ on
mammography



Fibrocystic disease

Definition

Fibrocystic disease is a condition caused by cyclical proliferation and involution of breast tissue producing *fibrosis*, epithelial hyperplasia (*adenosis*) and *cyst* formation.

Clinical features

- Age 25–45 years.
- Breast pain, tenderness and breast lump(s) during the second half of the menstrual cycle.

Management

- Patient reassurance, cyst aspiration, excision of persistent localized masses after aspiration.
- Avoid xanthine-containing substances.
- Drugs:
 - danazol: inhibits pituitary gonadotrophins;
 - tamoxifen: blocks effects of oestrogen.

Fibroadenoma

Benign breast tumour manifesting as one or more hard, mobile, painless lumps usually in women under 30 years of age. Treatment is by excision.

Breast abscess

Infection of the pregnant or lactating breast with *Staphylococcus aureus*. Patient presents with redness, swelling, heat and pain in the breast. Treatment is with antibiotics (flucloxacillin) initially but, if an abscess develops, incision and drainage will be required. Lactation should be suppressed while the abscess is being treated.

Mammary duct ectasia

Dilated subareolar ducts are filled with cellular debris which causes a periductal inflammatory response. The usual presentation is a green nipple discharge and a subareolar lump. Treatment is by subareolar excision of the involved ducts.

Duct papilloma

Small papillomas arise in the major breast ducts. They cause a bloody or serous nipple discharge. Treatment is by excision of the affected duct by microdochectomy.

Fat necrosis

- History of trauma to the breast in 50% of cases.
- Often associated ecchymoses.
- Histology: periductal cellular infiltrate.
- Treatment is by surgical excision.

48 Breast cancer

PREDISPOSITIONS

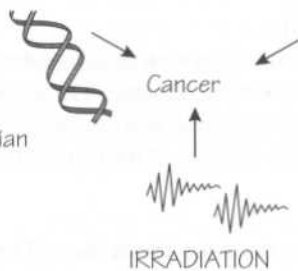
GENETIC

FHx

BrCa1

BrCa2

Caucasian

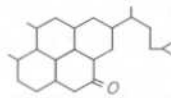


HORMONAL

Low, late parity

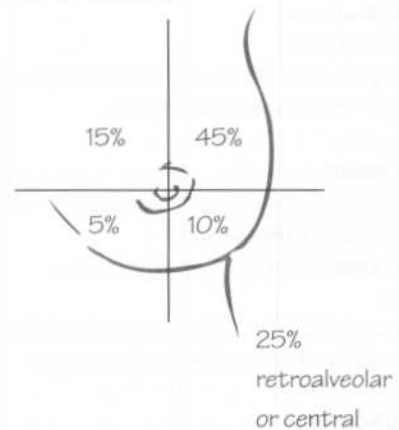
Anovulatory cycles

Postmenopausal oestrogen



IRRADIATION

LOCATION



STAGING



I Unfixed

II Unfixed
+ nodes

III Fixed
+ nodes

IV Metastases

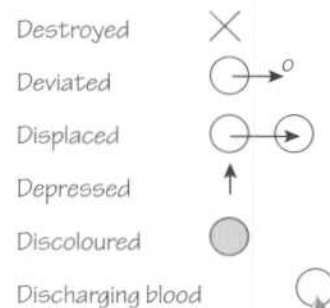
	Tumour	Nodes	Metastases
IS	<i>In situ</i>	—	—
O	Impalpable	None	None
1	< 2 cm	Unfixed Homolateral	Present
2	2–5 cm	Fixed Homolateral	—
3	5–10 cm	Contralateral or clavicular	—
4	> 10 cm Chest wall fixed	—	—

Ulceration = T + 1

CARDINAL SIGNS



NIPPLE CHANGES IN BREAST CANCER



Definition

Malignant lesion of (predominantly) the female breast.

Epidemiology

Male/female 1 : 100. Any age (usually > 30 years). High incidence in Western World and in white people more than black people.

Aetiology

The following are predisposing factors.

- Strong family history of breast cancer.
- Early menarche and late menopause especially in nulliparous women.
- Benign breast disease.
- Social class I and II.

Pathology

- Histology: adenocarcinomas arising from the glandular epithelium. Common types are *invasive ductal* or *lobular* carcinoma. *Paget's disease* is ductal carcinoma involving the nipple.
- Spread: lymphatics, vascular invasion, direct extension; spreads to lung, liver, bone, brain, adrenal, ovary.
- Staging: TNM classification, important for treatment and prognosis.

Clinical features

- Palpable breast lump, usually painless.
- Nipple retraction and skin dimpling.
- Nipple eczema in Paget's disease.
- *Peau d'orange* (cutaneous oedema secondary to lymphatic obstruction).
- Palpable axillary nodes.

Investigations

- Mammography: infiltrating radio-opaque mass and micro-calcification indicate malignancy.
- Breast biopsy: FNAC of suspicious lump usually confirms the diagnosis. Excision biopsy occasionally required.
- Imaging: chest X-ray, isotope bone scan and radiography of 'hot' spots, ultrasound scan of liver.
- FBC, serum alkaline phosphatase, γ -glutamyl transpeptidase, serum calcium — indicate liver or bone metastases.
- Breast tissue for hormone receptor status (ER+/-), important for treatment and prognosis.

Management

Early breast cancer

No evidence of distant spread at time of diagnosis.

- Surgery: simple mastectomy/radical mastectomy/segmental resection. With all of these resections the axilla should be dissected to assess the node status histologically.
- Radiotherapy: radiation is given if the axillary nodes are involved.
- Chemotherapy/hormonal therapy: adjuvant chemotherapy (cyclophosphamide, methotrexate, 5-FU) is given to premenopausal women with positive nodes and to postmenopausal women who are ER-. Tamoxifen is given to postmenopausal women who are ER+.
- Prognosis: 80% 10-year survival rate.

Late breast cancer

Spread to regional nodes or distant sites at time of diagnosis.

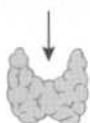
- Surgery: only for 'toilet' mastectomy.
- Radiotherapy: only to relieve pain from bony metastases.
- Chemotherapy: tamoxifen, aminoglutethimide.
- Prognosis: poor, only 30–40% respond to treatment with mean survival of 2 years, by which time the non-responders have died.

49 Goitre

HYPERTHYROIDISM



SECONDARY
Pituitary adenoma



PRIMARY
Graves' disease
(TSAbs)



Plummer's disease
toxic nodule
• Adenoma
• (Cyst)
• ((Carcinoma))



Poor concentration
Fine alopecia
Excitement

Lid lag
Lid retraction
Exophthalmos
Oculomotor palsies
↓ Blinking
Glitter eyes/chemosis

Thyroid bruit

Atrial
fibrillation

Weight loss

Heat intolerance

Tremor
Sweaty
Flushed

Tachycardia
High pulse
pressure

Hyper-reflexia
Diarrhoea

Pretibial myxoedema

HYPOTHYROIDISM



Idiopathic senile atrophy



PRIMARY
Autoimmune
(Hashimoto's)



SECONDARY
Pituitary failure



TERTIARY
Hypothalamic failure

Enzyme failures (congenital)

Poor work
Lassitude
Slow mentation

Hair loss
Thin eyebrows
Puffy eyelids

Hoarse voice

Coarse dry skin
Pallor
Bradycardia
Hypotension

Weight gain

Cold intolerance

Hyporeflexia
Bradykinesia
Constipation

Proximal myopathy

Peripheral oedema

Definition

A goitre is an enlargement of the thyroid gland from any cause.

Common causes

- Physiological: gland increases in size as a result of increased demand for thyroid hormone at puberty and during pregnancy.
- Iodine deficiency (endemic): deficiency of iodine results in decreased T_4 levels and increased TSH stimulation leading to a diffuse goitre.
- Primary hyperthyroidism (Graves' disease): goitre and thyrotoxicosis due to circulating immunoglobulin LATS.
- Adenomatous (nodular) goitre: benign hyperplasia of the thyroid gland.
- Thyroiditis:
 - autoimmune (Hashimoto's);
 - subacute (de Quervain's);
 - Riedel's (struma).
- Thyroid malignancies.

Clinical features

Hyperthyroidism

Symptoms

- Preference for cold.
- Excessive sweating.
- Increased appetite.
- Weight loss, diarrhoea.
- Anxiety and tiredness.
- Palpitations.
- Oligomenorrhoea.

Signs

- Goitre.
- Exophthalmos.
- Lid lag and retraction.
- Warm moist palms.
- Tremor.
- Atrial fibrillation.
- Pretibial myxoedema.

Hypothyroidism

Symptoms

- Cold intolerance.
- Decreased sweating.

- Hoarseness.
- Weight increase.
- Slow cerebation.
- Tiredness.
- Constipation.
- Muscle pains.

Signs

- Pale/yellow skin.
- Periorbital puffiness.
- Loss of outer third of eyebrow.
- Dry, thickened skin and hair.
- Dementia, nerve deafness.
- Slow pulse.
- Large tongue.
- Peripheral oedema.

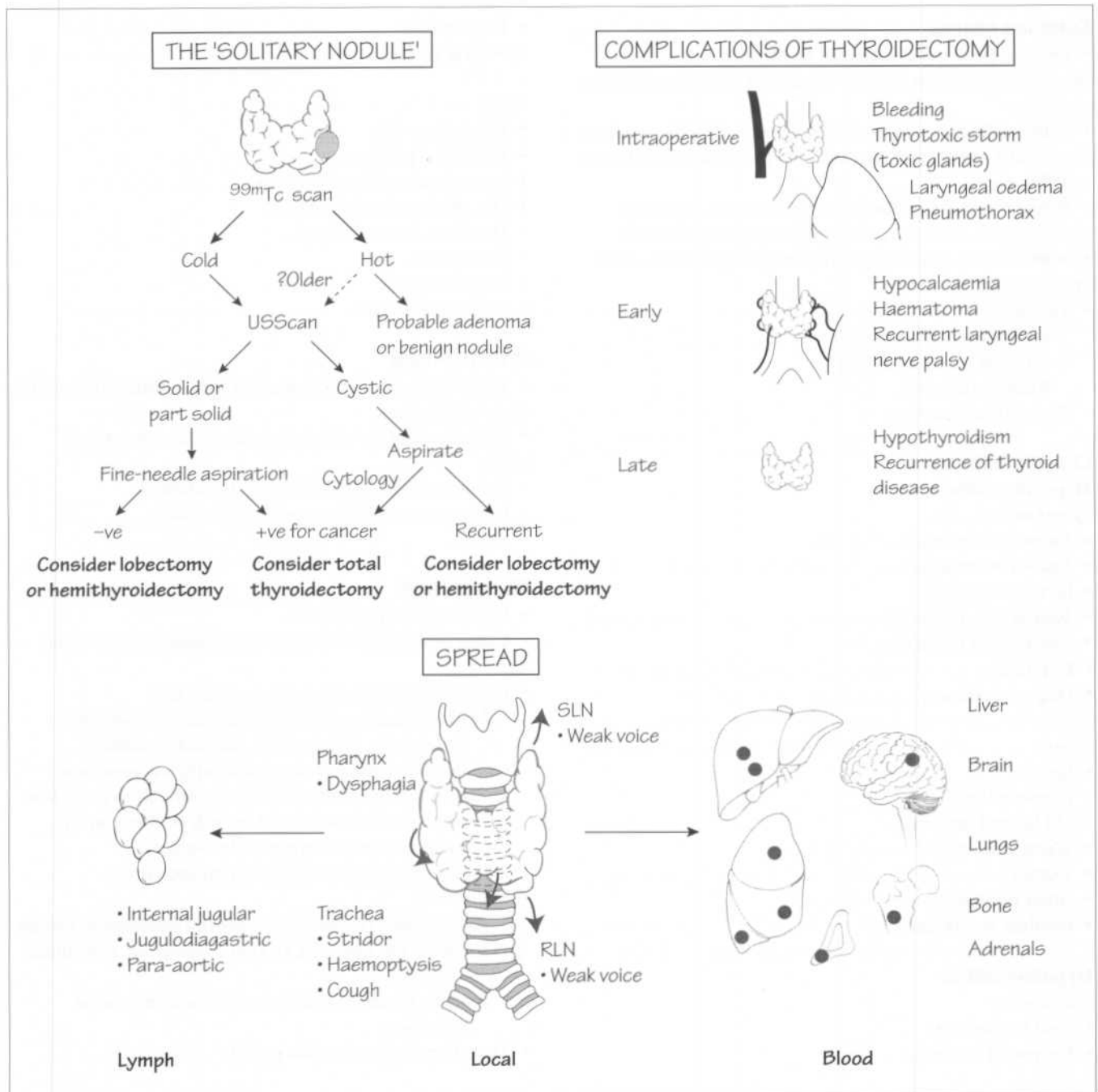
Investigations

- Ultrasound: for position of gland and to differentiate cystic from solid lesions.
- Plain X-ray of thoracic outlet and chest—retrosternal goitre.
- Serum tests: T_4 , T_3 , TSH, thyroid antibodies.
- Isotope scan: identifies hot or cold nodules.
- FNAC.

Management

- Physiological: reassurance.
- Iodine deficiency (endemic): supplemental iodine in the diet.
- Primary hyperthyroidism (Graves' disease).
 - Medical: antithyroid drugs (carbimazole (side-effect leucopenia), propranolol), radioactive iodine (hypothyroidism is inevitable with this treatment).
 - Surgical: subtotal thyroidectomy (difficult to judge how much gland should be taken, risk of nerve injury, haemorrhage and hypoparathyroidism).
- Adenomatous (nodular) goitre: thyroidectomy.
- Thyroiditis.
 - Autoimmune (Hashimoto's): thyroid replacement therapy.
 - Subacute (de Quervain's): simple analgesia, sometimes steroids.
 - Riedel's (struma): resection only for compression symptoms.
- Thyroid malignancies. See p. 104.

50 Thyroid malignancies



Definition

Malignant lesions of the thyroid gland.

Epidemiology

Male/female 1 : 2. Age depends on histology (papillary, young adults; follicular, middle age; anaplastic, elderly; medullary, any age).

Aetiology

The following are predisposing factors.

- Pre-existing goitre.
- Radiation of the neck in childhood.

Pathology

Table 1 Histology of thyroid malignancies.

Type	(% of total)	Cell of origin	Differentiation	Spread
Papillary	(60%)	Epithelial	Well	Lymphatic
Follicular	(25%)	Epithelial	Well	Haematogenous
Anaplastic	(10%)	Epithelial	Poor	Direct, lymphatic and haematogenous
Medullary	(5%)	Parafollicular	Moderate	Lymphatic and haematogenous

Clinical features

- Papillary: solitary thyroid nodule.
- Follicular: slow-growing thyroid mass, symptoms from distant metastases.
- Anaplastic: rapidly growing thyroid mass causing tracheal and oesophageal compression.
- Medullary: thyroid lump, may have MEN IIA (medullary thyroid carcinoma, pheochromocytoma, hyperparathyroidism) or IIB (medullary thyroid carcinoma, pheochromocytoma, multiple mucosal neuromas, Marfanoid habitus) syndrome.

Investigations

- Ultrasound of the thyroid gland.
- Isotope scan: a 'cold' nodule is suspicious for malignancy.
- FNAC: gives histological diagnosis.
- Bone scan and radiographs of bones for secondary deposits.
- Calcitonin levels as a marker for medullary carcinoma.

Management

Papillary

- Surgery: total thyroidectomy and removal of involved lymph nodes.
- Adjunctive treatment: L-thyroxine postoperatively to suppress TSH production which stimulates papillary tumour growth.
- Prognosis: excellent.

Follicular

- Surgery: thyroid lobectomy or total thyroidectomy if metastases are present.

- Adjunctive treatment: radioactive iodine (^{131}I) for distant metastases and L-thyroxine for replacement therapy to suppress TSH.
- Prognosis: no metastases, 90% 10-year survival; metastases, 30% 10-year survival.

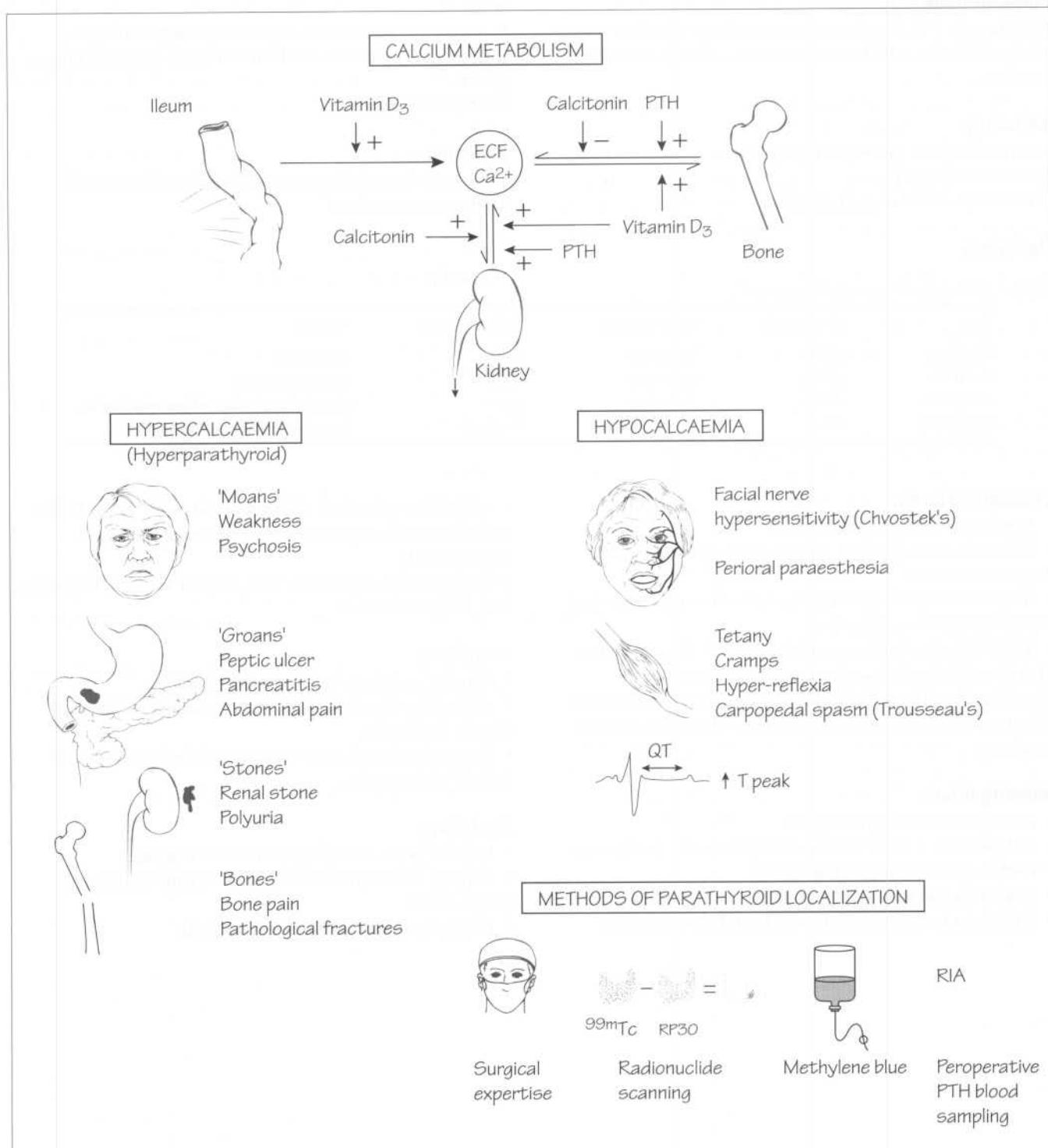
Anaplastic

- Surgery: only to relieve pressure symptoms.
- Adjunctive treatment: neither radiotherapy nor chemotherapy is effective.
- Prognosis: dismal, most patients will be dead within 12 months of diagnosis.

Medullary

- Exclude pheochromocytoma before treating.
- Surgery: total thyroidectomy and excision of regional lymph nodes.
- Prognosis: overall 50% 5-year survival.

51 Parathyroid disease



Hyperparathyroidism

Definition

Hyperparathyroidism is a condition characterized by hypercalcaemia caused by excess production of parathyroid hormone.

Common causes

- *Primary* hyperparathyroidism is due to a parathyroid adenoma or parathyroid hyperplasia.
- *Secondary* hyperparathyroidism is hyperplasia of the gland in response to *hypocalcaemia* (e.g. in chronic renal failure there is failure of conversion of 25-hydroxycholecalciferol to 1,25-dehydroxycholecalciferol resulting in impaired calcium absorption).
- In *tertiary* hyperparathyroidism, autonomous secretion of parathormone occurs when the secondary stimulus has been removed (e.g. after renal transplantation).
- *MEN syndromes* and *ectopic* parathormone production (e.g. oat cell carcinoma of the lung).

Pathology

- Parathormone mobilizes calcium from bone, enhances renal tubular absorption and, with vitamin D, intestinal absorption of calcium. The net result is *hypercalcaemia*.

Clinical features

- Renal calculi or renal calcification, polyuria.
- Bone pain, bone deformity, osteitis fibrosa cystica, pathological fractures.
- Muscle weakness, anorexia, intestinal atony, psychosis.
- Peptic ulceration and pancreatitis.

Diagnosis

- Serum calcium (specimen taken on three occasions with patient fasting, at rest and without a tourniquet). Normal range 2.2–2.6 mmol/l. Calcium is bound to albumin and the level has to be 'corrected' when albumin levels are abnormal.
- Parathormone level.
- Imaging.
 - High-resolution ultrasound.

CT and MRI scanning.

Dual isotope imaging (^{201}Tl and $^{99\text{m}}\text{Tc}$ pertechnate).

- Selective vein catheterization and digital subtraction angiography in patients in whom exploration has been unsuccessful.

Treatment

- Primary and tertiary hyperparathyroidism are treated surgically: excise adenoma if present, remove three and a half glands for hyperplasia.
- Secondary hyperplasia: vitamin D and/or calcium.

Hypoparathyroidism

Definition

A rare condition characterized by hypocalcaemia due to reduced production of parathormone.

Causes

- Post-thyroid or parathyroid surgery.
- Idiopathic.
- Pseudohypoparathyroidism (reduced sensitivity to parathormone).

Pathology

- Reduced serum calcium increases neuromuscular excitability.

Clinical features

- Perioral paraesthesia, cramps, tetany.
- *Chvostek's sign*: tapping over facial nerve induces facial muscle contractions.
- *Trousseau's sign*: inflating BP-cuff to above systolic pressure induces typical *main d'accoucheur* carpal spasm.
- Prolonged QT interval on ECG.

Diagnosis

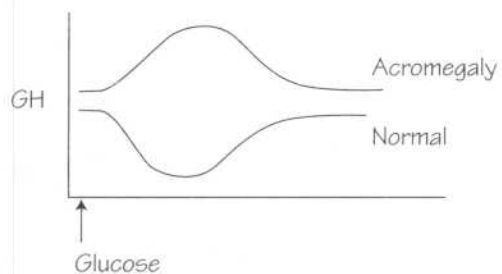
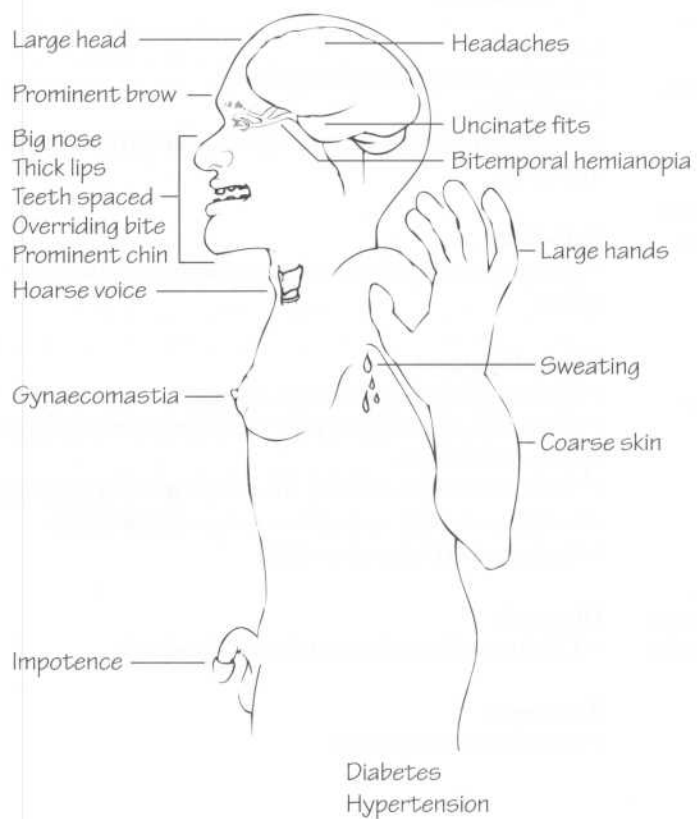
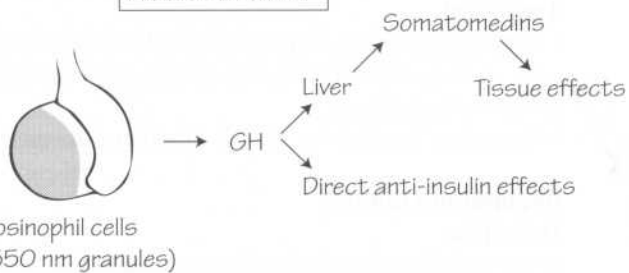
- Calcium and parathormone levels decreased.

Treatment

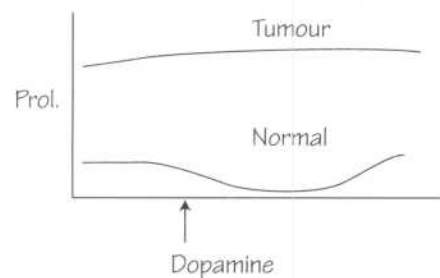
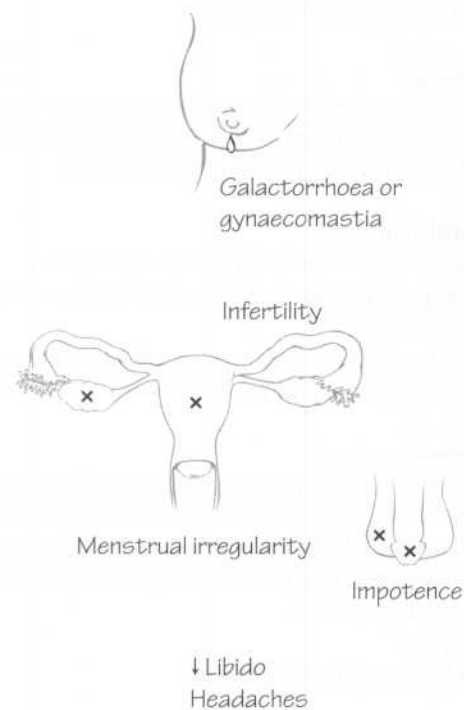
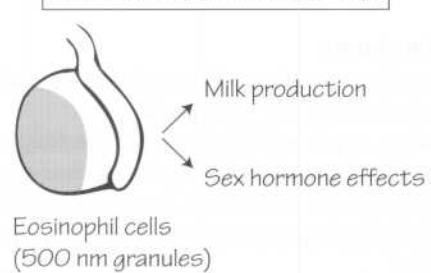
- Calcium and vitamin D.

52 Pituitary disorders

ACROMEGALY



HYPERPROLACTINAEMIA



Definition

Pituitary disorders are characterized either by a *failure of secretion* of pituitary hormones or by *tumours*, which cause local pressure effects or specific syndromes due to hormone overproduction.

Common causes

- Failure of secretion, pan-hypopituitarism (Simmonds' disease):
 - pressure from a tumour;
 - infection;
 - ischaemia;
 - post-partum-induced infarction of the anterior pituitary (Sheehan's syndrome).
- Failure of antidiuretic hormone production from the posterior pituitary gland leads to diabetes insipidus:
 - trauma;
 - local haemorrhage;
 - ischaemia;
 - tumours.

• Tumours (% of total)

Endocrinologically active (75%)

Prolactinomas (35%)

GH-secreting tumours (20%)

Mixed PL and GH (10%)

ACTH-secreting tumours (10%)

Endocrinologically inactive (25%)

Craniopharyngioma

Cell type

Acidophil

Acidophil

Acidophil

Basophil

Chromophobe

Rathke's pouch

Clinical features

- Pan-hypopituitarism: pallor (MSH), hypothyroid (TSH), failure of lactation (PL), chronic adrenal insufficiency (ACTH), ovarian failure and amenorrhoea (FSH, LH).
- Diabetes insipidus: polyuria (5–20 l/day), polydipsia.
- Tumours: pressure effects: headache, bitemporal hemianopia.
 - Acromegaly* (excess GH): thickened skin, increased skull size, prognathism, enlarged tongue, goitre, osteoporosis, organomegaly, spade-like hands and feet.
 - Cushing's disease* (excess ACTH): malaise, muscle weakness, weight gain, bruising, moon facies, buffalo hump, hirsutism, amenorrhoea, impotence, polyuria, diabetes, emotional instability.

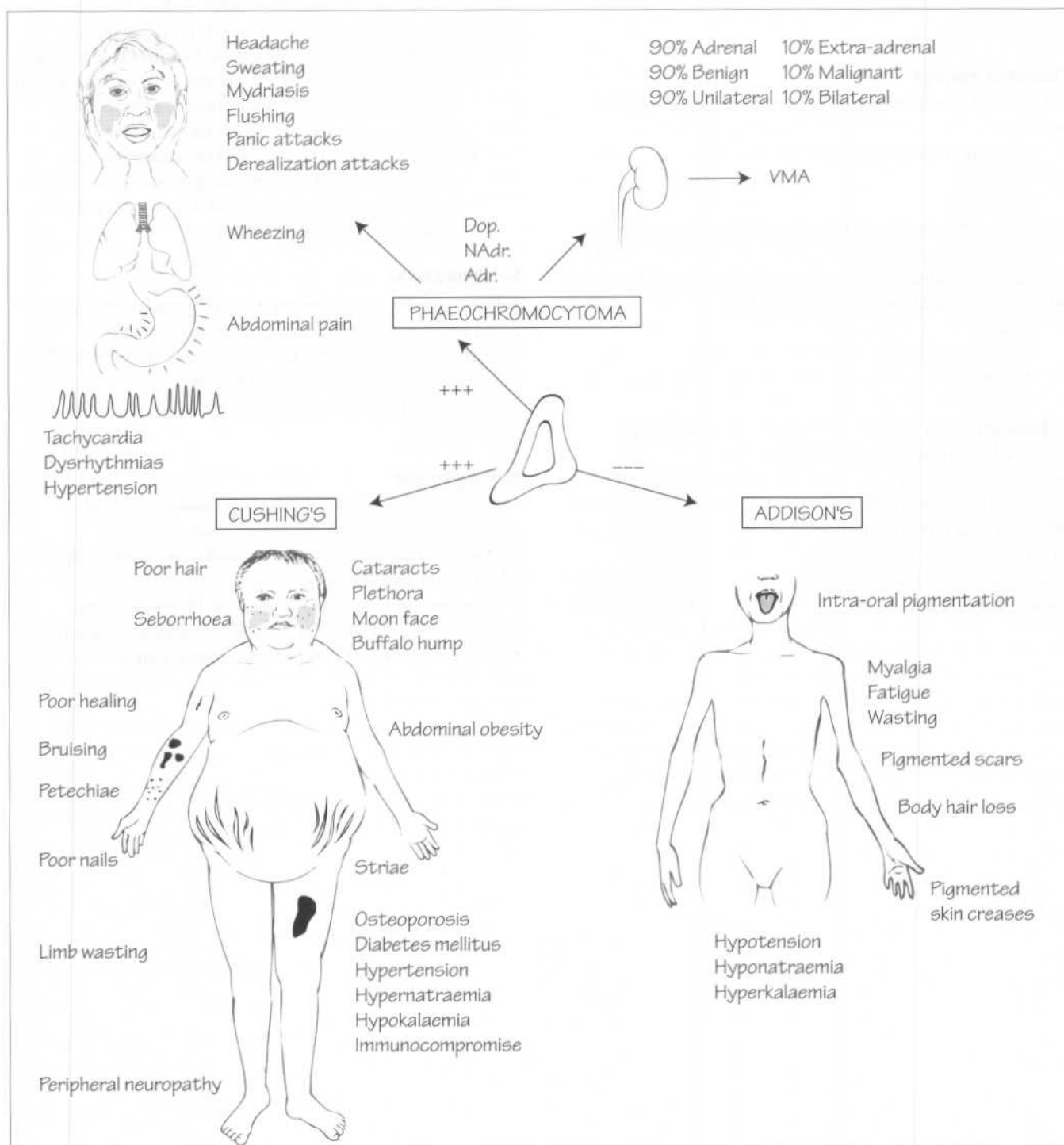
Investigations

- Pan-hypopituitarism: serum assay of pituitary and target gland hormones, dynamic tests of pituitary function.
- Diabetes insipidus: very low urinary specific gravity which does not increase with water deprivation.
- Tumours: visual field measurements, hormone assay, CT or MRI scanning.

Management

- Pan-hypopituitarism: replacement therapy: cyclical oestrogen–progesterone, hydrocortisone, thyroxine.
- Diabetes insipidus: vasopressin analogue, *desmopressin*, administered as nasal spray.
- Tumours: bromocriptine suppresses PL release from prolactinomas, ⁹⁰Y implant for pituitary ablation, surgery (hypophysectomy via nasal or transcranial route).

53 Adrenal disorders



Definition

Adrenal gland disorders are characterized by clinical syndromes resulting from either a *failure of secretion* or *excessive secretion* of adrenal cortical or medullary hormones.

Common causes

Failure of secretion

- Adrenal insufficiency, Addison's disease: bilateral adrenal haemorrhage in sepsis (Waterhouse–Friderichsen syndrome), autoimmune disease, TB, pituitary insufficiency, metastatic deposits.

Excessive secretion

- Cushing's syndrome: excess corticosteroid due to steroid therapy, ACTH-producing pituitary tumour, adenoma or carcinoma of the adrenal cortex, ectopic ACTH production, e.g. oat-cell carcinoma of lung.
- Conn's syndrome, primary hyperaldosteronism: excess aldosterone due to adenoma or carcinoma of adrenal cortex, bilateral cortical hyperplasia.
- Adrenogenital syndrome: excess androgen: abnormal cortisol synthesis causes excess ACTH production which boosts androgen production, adrenal cortical tumour.
- Pheochromocytoma: excess catecholamines due to adrenal medullary tumours, 95% are benign.

Clinical features

- Adrenal insufficiency, Addison's disease: lethargy, weakness, nausea, vomiting, weight loss, skin pigmentation, dizziness, hypotension. Addisonian crisis: an acute collapse which may mimic an abdominal emergency.
- Cushing's syndrome: malaise, muscle weakness, weight gain, bruising, moon facies, buffalo hump, hirsutism, amenorrhoea, impotence, polyuria, diabetes, emotional instability.
- Conn's syndrome, primary hyperaldosteronism: muscle weakness, tetany, polyuria, polydipsia, hypertension.

- Adrenogenital syndrome: virilization in female children, pseudohermaphroditism, precocious puberty.
- Pheochromocytoma: paroxysmal hypertension, palpitations, tremor, flushing or pallor, sweating, anxiety.

Investigations

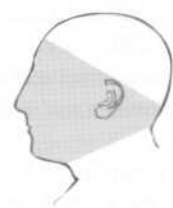
- Adrenal insufficiency, Addison's disease: low Na^+ , low plasma cortisol, Synacthen test to differentiate primary (adrenal) from secondary (pituitary) insufficiency.
- Cushing's syndrome: elevated plasma cortisol and loss of diurnal variation, dexamethasone suppression test to distinguish adrenal from pituitary disease.
- Conn's syndrome, primary hyperaldosteronism: low K^+ , normal or high Na^+ , raised aldosterone and normal renin levels.
- Adrenogenital syndrome: elevated urinary 17 ketosteroids.
- Pheochromocytoma: 24-hour urinary VMA, dopamine, adrenaline and noradrenaline.
- Imaging of the adrenal gland is achieved with ultrasound and CT scanning. Arteriography and venous sampling may also be required.

Management

- Adrenal insufficiency: replacement therapy. Cortisol 20 mg mane, 10 mg *nocte*, fludrocortisone 0.1 mg daily. Increase dose at times of stress.
- Cushing's syndrome: adrenalectomy for adenoma and to debulk carcinoma. Mitotane reduces steroid production in metastases.
- Conn's syndrome: adrenalectomy for adenoma and carcinoma. Spironolactone or amiloride for hyperplasia. If poor response, subtotal adrenalectomy or total adrenalectomy with replacement therapy.
- Adrenogenital syndrome: cortisol to suppress ACTH and provide corticosteroids. Surgery to correct abnormalities of external genitalia.
- Pheochromocytoma: surgery under α and β adrenergic blockade.

54 Skin cancer

BASAL CELL CARCINOMA



Sites of predilection



Waxy appearance of growing edge
Pearly
Central slough
Umbilicated
Raised rolled edge
Well circumscribed



SQUAMOUS CELL CARCINOMA



Sites of predilection

Sun exposure

Associated features
• 'Solar' keratosis
• 'Weathered' skin



++
manual workers

Other causes

Association with infection

- Osteomyelitis
- Abscess



Chronic irritation



Chronic trauma

Skin infection

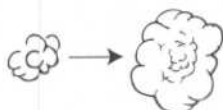
- TB
- Syphilis
- Leprosy

Poorly defined edge
Deep penetration
Everted edge
Centrally necrotic
• Friable
• Bleeding



MALIGNANT MELANOMA

Principal features suggesting malignancy



Increase in size



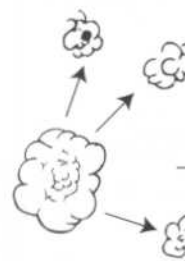
Change in
pigmentation



Itching



Bleeding



Satellite lesions



Lymphadenopathy

Definition

Malignant lesions of skin—basal cell (BCC) and squamous cell (SCC) carcinomas and malignant melanoma (MM).

Epidemiology

Male/female 2:1 for BCC and SCC. Elderly males. Equal sex distribution and all adults for MM. All tumours common in areas of high annual sunshine (e.g. Australia, southern USA).

Aetiology

The following are predisposing factors.

- Exposure to sunlight (especially in fair-skinned races).
- Immunosuppression (high incidence after renal transplant).
- Radiation exposure (radiotherapy, among radiologists).
- Chemical carcinogens (hydrocarbons, arsenic, coal tar).
- Inherited disorders (albinism, xeroderma pigmentosum).
- Chronic irritation (Marjolin's ulcer).
- Naevi (50% of MM arise in pre-existing benign pigmented lesions).
- Bowen's disease and erythroplasia of Queryat.

Pathology

BCC

- Arises from basal cells of epidermis.
- Aggressive local spread but do *not* metastasize.

SCC

- Arises from keratinocytes in the epidermis.
- Spreads by local invasion and metastases.

MM

- Arises from the melanocytes often in pre-existing naevi.
- Superficial spreading and nodular types.
- Radial and vertical growth phases. Lymphatic spread is to regional lymph nodes and haematogenous spread to liver, bone and brain.

Staging

Clarke's levels I–V, Breslow's—tumour thickness.

Clinical features

BCC

Recurring, ulcerated, umbilicated skin lesion on forehead or face. Ulcer has a raised, pearl-coloured edge. Untreated, large areas of the face may be eroded (rodent ulcer).

SCC

Lesions (ulcers, fungating lesions with heaped-up edges) on exposed areas of the body.

MM

Pigmented lesions (occasionally not pigmented—amelanotic), 1cm in diameter on lower limbs, feet, head and neck. Usually present as a change in a pigmented lesion: increasing size or pigmentation/bleeding/pain or itching/ulceration/satellite lesions.

Investigations

Biopsy (usually excisional) of the lesion.

Management

BCC

- Curettage/cautery/cryotherapy/topical chemotherapy (5-FU). These treatments are suitable for small lesions.
- Surgical excision/radiotherapy (40–60 Gy over 2–3 weeks).

SCC

- Surgical excision/radiotherapy.

MM

- Surgical excision with 2–3 cm margin.
- Nodes involved—node dissection.
- Immunotherapy, chemotherapy (systemic and local limb perfusion), radiotherapy.

Prognosis

BCC, SCC

Prognosis is usually excellent, but patients with SCC should be followed for 5 years.

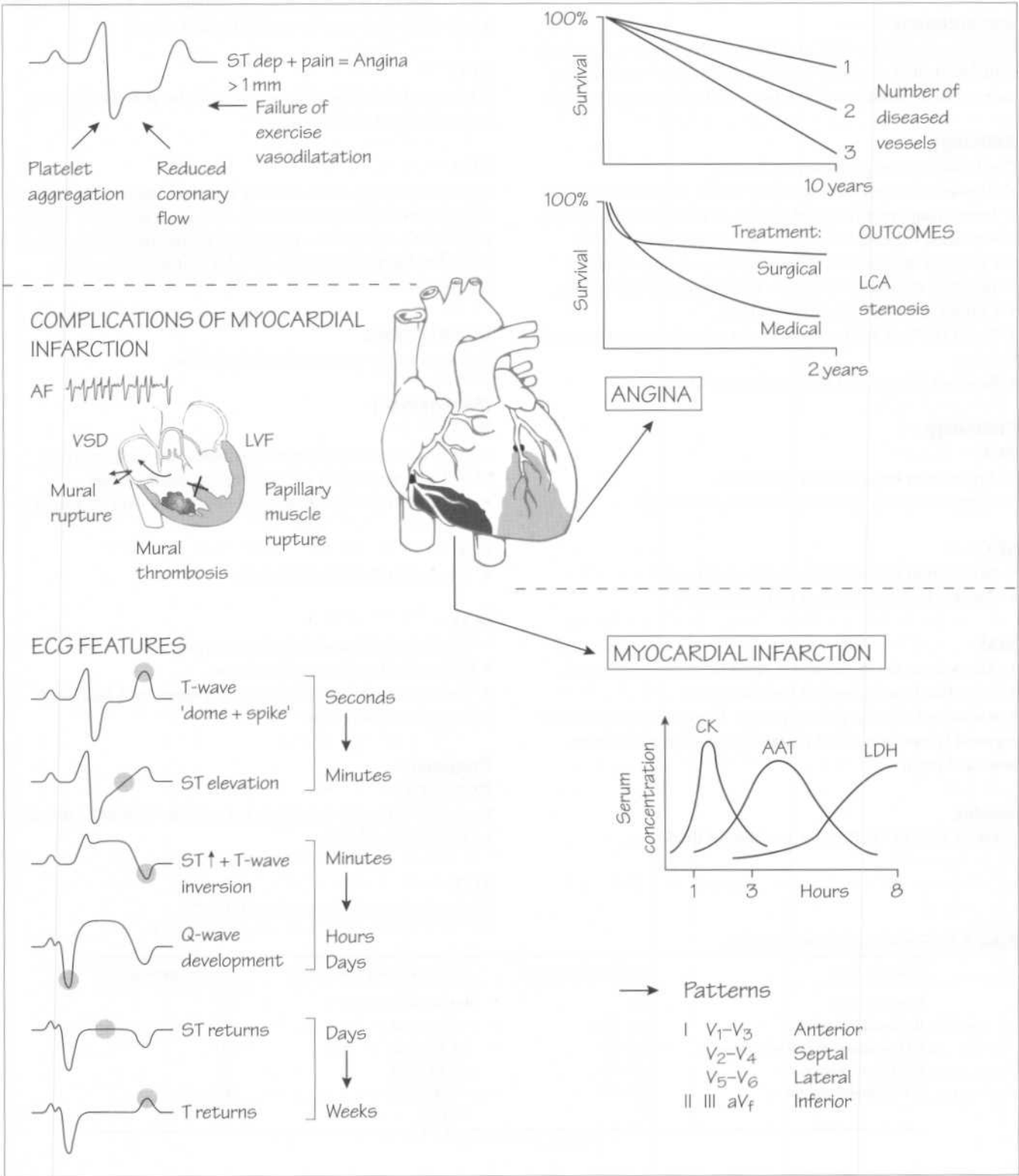
MM

Prognosis depends on staging (Table 2).

Table 2 Staging for malignant melanoma.

Clarke's level	5-year survival (%)	Tumour thickness (mm)	5-year survival (%)
I (epidermis)	100	<0.76	98
II (papillary dermis)	90–100	0.76–1.49	95
III (papillary/reticular dermis)	80–90	1.50–2.49	80
IV (reticular dermis)	60–70	2.50–3.99	75
V (subcutaneous fat)	15–30	4.00–7.99	60
		>8.00	40

55 Ischaemic heart disease



Definition

Ischaemic heart disease is a common disorder caused by acute or chronic interruption of the blood supply to the myocardium, usually due to atherosclerosis of the coronary arteries, i.e. *coronary artery disease*.

Epidemiology

Male > female before age 65. Increasing risk with increasing age up to 80 years. Commonest cause of death in Western World.

Aetiology

- Atherosclerosis and thrombosis.
- Thromboemboli.
- Arteritis (e.g. periarteritis nodosa).
- Coronary artery spasm.
- Extension of aortic dissecting aneurysm.
- Syphilitic aortitis.

Risk factors

- Cigarette smoking.
- Hypertension.
- Hyperlipidaemia.
- Type A personality.
- Obesity.

Pathology

- Reduction in coronary blood flow is critical when lumen is decreased by 90%.
- Angina pectoris results when the supply of O₂ to the heart muscle is unable to meet the increased demands for O₂, e.g. during exercise, cold, after a meal.
- Thrombotic occlusion of the narrowed lumen precipitates acute ischaemia.
- The heart muscle in the territory of the occluded vessel dies, i.e. myocardial infarction. May be subendocardial or transmural.

Clinical features

Angina pectoris

- Central chest pain on exertion, especially in cold weather, lasts 1–15 min.
- Radiates to neck, jaw, arms.
- Relieved by GTN.
- Usually no signs.

Myocardial infarction

- Severe central chest pain for >30 min duration.
- Radiates to neck, jaw, arms.
- Not relieved by GTN.

- Signs of cardiogenic shock.
- Arrhythmias.

Investigations

Angina pectoris

- FBC for anaemia.
- Thyroid function tests.
- Chest X-ray for heart size.
- ECG ST-segment changes.
- Exercise ECG.
- Coronary angiography.

Myocardial infarction

- ECG—Q waves, ST-segment and T-wave changes.
- Cardiac enzymes—LDH/CPK, CPK-MB.
- Chest X-ray.
- FBC.
- U+E.

Management

Angina pectoris

- Lose weight.
- Avoid precipitating factors (e.g. cold).
- GTN (sublingual).
- Calcium channel blockers.
- β -Blockers, nitrates, aspirin.
- Treatment of hypertension and hyperlipidaemias.
- Coronary angioplasty or CABG.

Myocardial infarction

- Bed rest, O₂, analgesia.
- Thrombolysis.
- Aspirin.
- Treatment of heart failure (diuretics).
- Treatment of arrhythmias.

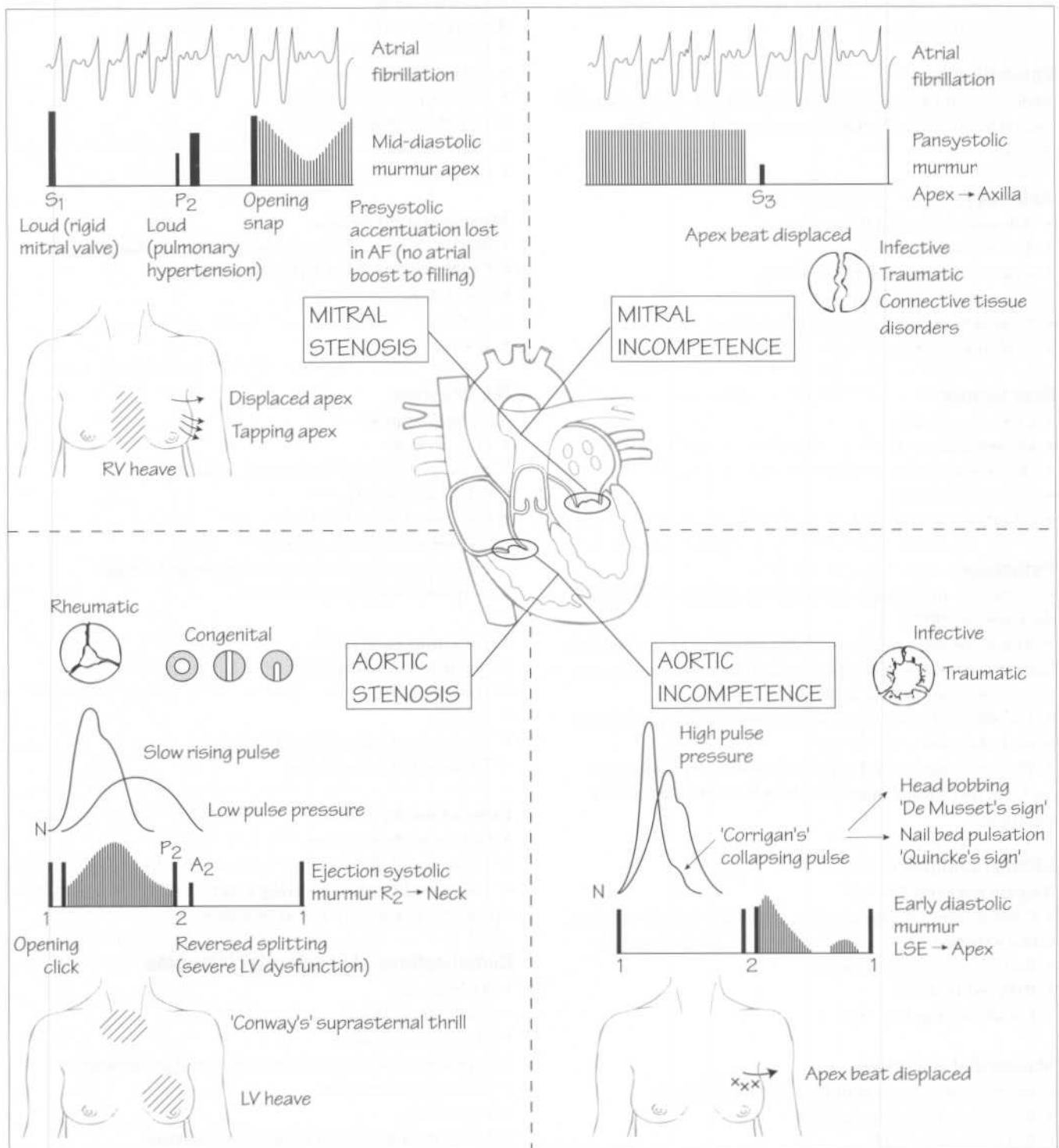
Indications for CABG

- Left main stem disease.
- Triple vessel disease.
- Two vessel disease involving LAD.
- Chronic ischaemia+LV dysfunction.

Complications of myocardial infarction

- Arrhythmias.
- Cardiogenic shock.
- Myocardial rupture.
- Papillary muscle rupture causing mitral incompetence.
- Ventricular aneurysm.
- Pericarditis.
- Mural thrombosis and peripheral embolism.

56 Valvular heart disease



Definition

Valvular heart disease is defined as a group of conditions characterized by damage to one or more of the heart valves resulting in deranged blood flow through the heart chambers.

Epidemiology

Rheumatic fever is still a major problem in developing countries while *congenital heart disease* occurs in 8–10 cases per 1000 live births worldwide.

Aetiology

- Congenital valve abnormalities.
- Rheumatic fever.
- Infective endocarditis.
- Degenerative valve disease.

Pathology

- Rheumatic fever—*immune-mediated acute inflammation* affecting the heart valves due to a cross-reaction between antigens of group A β -haemolytic *Streptococcus* and cardiac proteins.
- Disease may make the valve orifice smaller (*stenosis*) or unable to close properly (*incompetence or regurgitation*) or both.
- Stenosis causes a *pressure load* while regurgitation causes a *volume load* on the heart chamber immediately proximal to it with upstream and downstream effects.

Clinical features

Aortic stenosis

- Angina pectoris.
- Syncope.
- Left heart failure.
- Slow upstroke arterial pulse.
- Precordial systolic thrill (second right ICS).
- Harsh midsystolic ejection murmur (second right ICS).

Aortic regurgitation

- Congestive cardiac failure.
- Increased pulse pressure.
- Water-hammer pulse.
- Decrescendo diastolic murmur (lower left sternal edge).

Mitral stenosis

- Pulmonary hypertension.

- Paroxysmal nocturnal dyspnoea.
- Atrial fibrillation.
- Loud first heart sound and opening snap.
- Low-pitched diastolic murmur with presystolic accentuation at the apex.

Mitral regurgitation

- Chronic fatigue.
- Pulmonary oedema.
- Apex laterally displaced, hyperdynamic precordium.
- Apical pansystolic murmur radiating to axilla.

Tricuspid stenosis

- Fatigue.
- Peripheral oedema.
- Liver enlargement/ascites.
- Prominent JVP with large a-waves.
- Lung fields are clear.
- Rumbling diastolic murmur (lower left sternal border).

Tricuspid regurgitation

- Chronic fatigue.
- Hepatomegaly/ascites.
- Right ventricular heave.
- Prominent JVP with large v-waves.
- Pansystolic murmur (subxyphoid area).

Investigations

- ECG.
- Chest X-ray.
- Echocardiography and colour Doppler techniques.
- Cardiac catheterization with measurement of transvalvular gradients.

Management

- Medical: treat cardiac failure, diuretics, restrict salt intake, reduce exercise, digitalis for rapid atrial fibrillation and anticoagulation for peripheral embolization.
- Surgical: repair (possible in mitral and tricuspid valve only) or replace diseased valve (requires cardiopulmonary bypass). *Prosthetic* (lifelong anticoagulation), *bioprosthetic* (animal tissue on prosthetic frame, 3 months' anticoagulation) and *biological* (cadaveric homografts, no anticoagulation) valves available.

57 Peripheral occlusive vascular disease

	CHRONIC ISCHAEMIA		
	AORTO-ILIAC	FEMORO-POPLITEAL	INFRA-POPLITEAL
Sites affected	Buttocks Thighs Pelvis (including sex organs)	Thighs Calves	Calves Feet
Pulses affected			
Treatment options			
Balloon angioplasty			
Intraluminal stent			
		Only for profunda origin disease	
		Endarterectomy + profundaplasty	Femoro-distal vein graft
Anatomical grafts			
• Aorto-bi-iliac	5-year patency 90%	Saphenous vein in situ or reversed	5-year patency <60%
• Aorto-bifemoral		5-year patency 70-80%	
		Femoro-popliteal vein graft	
	5-year patency 60%	Gortex ± armoured	5-year patency 60-70%
		Femoro-popliteal synthetic graft	
Extra-anatomical grafts			
• Axillo-bifemoral			
• Femoro-femoral			

Definition

Peripheral occlusive vascular disease is a common disorder caused by acute or chronic interruption of the blood supply to the limbs, usually due to atherosclerosis.

Epidemiology

Male > female before age 65. Increased risk with increased age.

Aetiology

- Atherosclerosis and thrombosis.
- Embolism.
- Vascular trauma.
- Buerger's disease.

Risk factors

- Cigarette smoking.
- Hypertension.
- Hyperlipidaemia.
- Diabetes mellitus.

Pathology

• Reduction in blood flow to the peripheral tissues results in ischaemia which may be acute or chronic. *Critical ischaemia* is present when the reduction of blood flow is such that tissue viability cannot be sustained.

Clinical features

Chronic ischaemia

- Intermittent claudication in calf (femoral), thigh (iliac) or buttock (aortic occlusion).
- Cold peripheries.
- Prolonged capillary refill time.
- Rest pain especially at night.
- Venous guttering.
- Absent pulses.
- Arterial ulcers.
- Gangrene over pressure points.
- Knee contractures.

Acute ischaemia

- Pain.
 - Pallor.
 - Pulselessness.
 - Paraesthesia.
 - Paralysis.
 - 'Perishing' cold.
 - Pistol shot onset.
 - Mottling.
 - Muscle rigidity.
- } Late signs

Investigations

Chronic ischaemia

- ABI (normal > 1.0) at rest and post-exercise on treadmill.
- FBC (exclude polycythaemia).
- Doppler wave-form analysis.
- Digital plethysmography (in diabetes).
- Prefemoral angiography.

Acute ischaemia

- ECG, cardiac enzymes.
- Angiography (?), may be performed peroperatively.
- Find source of embolism.
 - Holter monitoring.
 - Echocardiograph.
 - Ultrasound aorta for AAA.

Management

Non-disabling claudication

- Stop smoking.
- Exercise programme.
- Avoid β -blockers.
- Aspirin 75 mg/day.
- Pentoxifylline (?).

Disabling claudication/critical ischaemia

- Balloon angioplasty $\pm$ intravascular stent.
- Bypass surgery.
- Amputation.
- i.v. treatment: Ilprost.

Acute ischaemia

- Heparin anticoagulation.
- Surgical embolectomy.
- Thrombolytic therapy (streptokinase, t-PA, urokinase).

Prognosis

Non-disabling claudication

• > 65% respond to conservative management. The rest require more aggressive treatment.

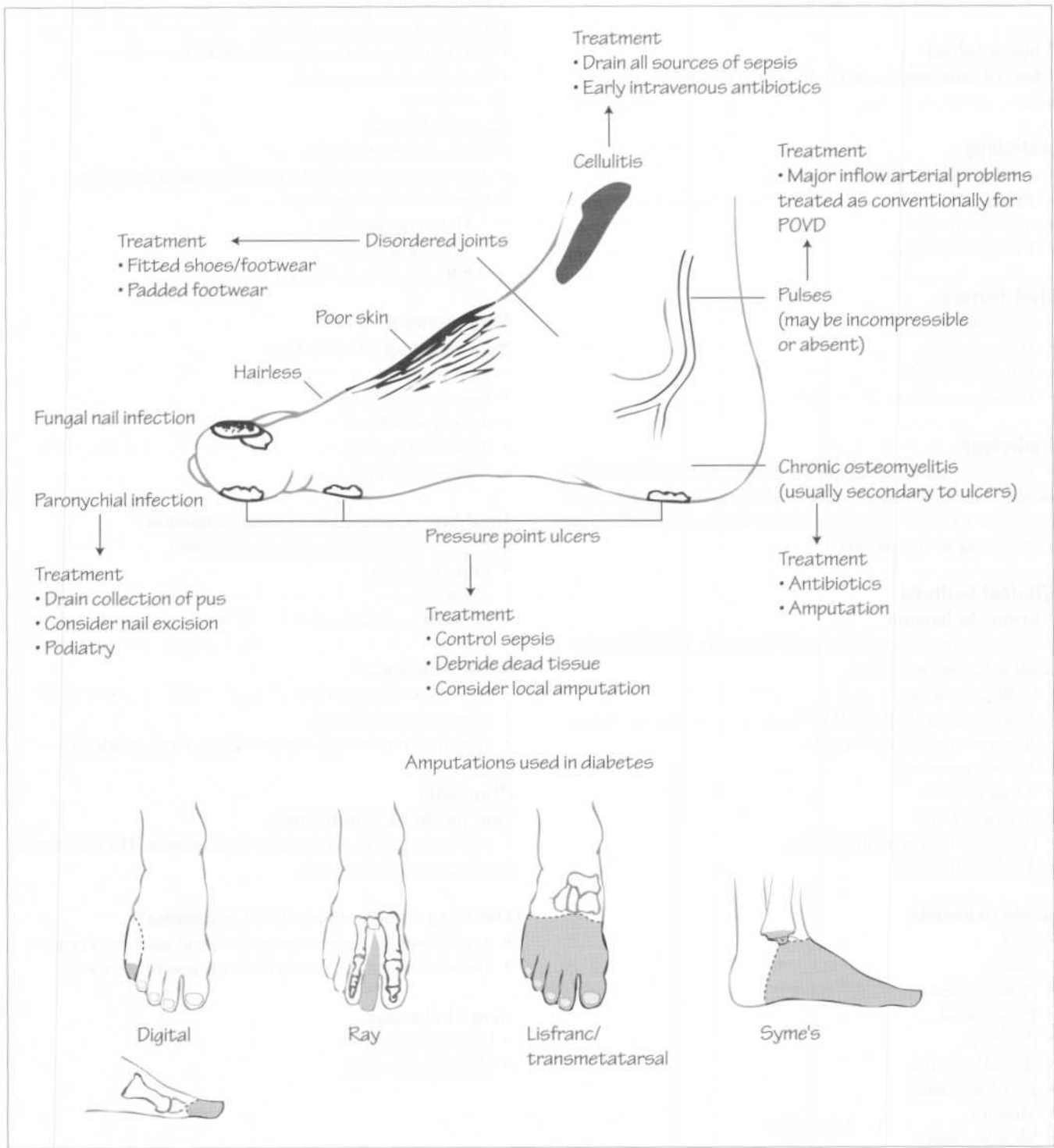
Disabling claudication/critical ischaemia

- Angioplasty and bypass surgery overall give good results.
- The more distal the anastomosis the poorer the result.

Acute ischaemia

- Limb salvage 85%.
- Mortality 10–15%.

58 The diabetic foot



Definition

The term 'diabetic foot' refers to a spectrum of foot disorders ranging from ulceration to gangrene occurring in diabetic people as a result of peripheral neuropathy or ischaemia, or both.

Pathophysiology

Three distinct processes lead to the problem of the diabetic foot.

- *Ischaemia* caused by macro- and micro-angiopathy.
- *Neuropathy*: sensory, motor and autonomic.
- *Sepsis*: the glucose-saturated tissue promotes bacterial growth.

Clinical features

Neuropathic features

- Sensory disturbances.
- Trophic skin changes.
- Plantar ulceration.
- Degenerative arthropathy (Charcot's joints).
- Pulses often present.
- Sepsis (bacterial/fungal).

Ischaemic features

- Rest pain.
- Painful ulcers over pressure areas.
- History of intermittent claudication.
- Absent pulses.
- Sepsis (bacterial/fungal).

Investigations

- Non-invasive vascular tests — ABI, segmental pressure, digital pressure. ABI may be falsely elevated due to medial sclerosis.

- X-ray of foot may show osteomyelitis.
- Arteriography.

Management

Should be undertaken jointly by surgeon and physician as diabetic foot may precipitate diabetic ketoacidosis.

Prevention

Do

- Carefully wash and dry feet daily.
- Inspect feet daily.
- Take meticulous care of toenails.
- Use antifungal powder.

Do not

- Walk barefoot.
- Wear ill-fitting shoes.
- Use a hot water bottle.
- Ignore any foot injury.

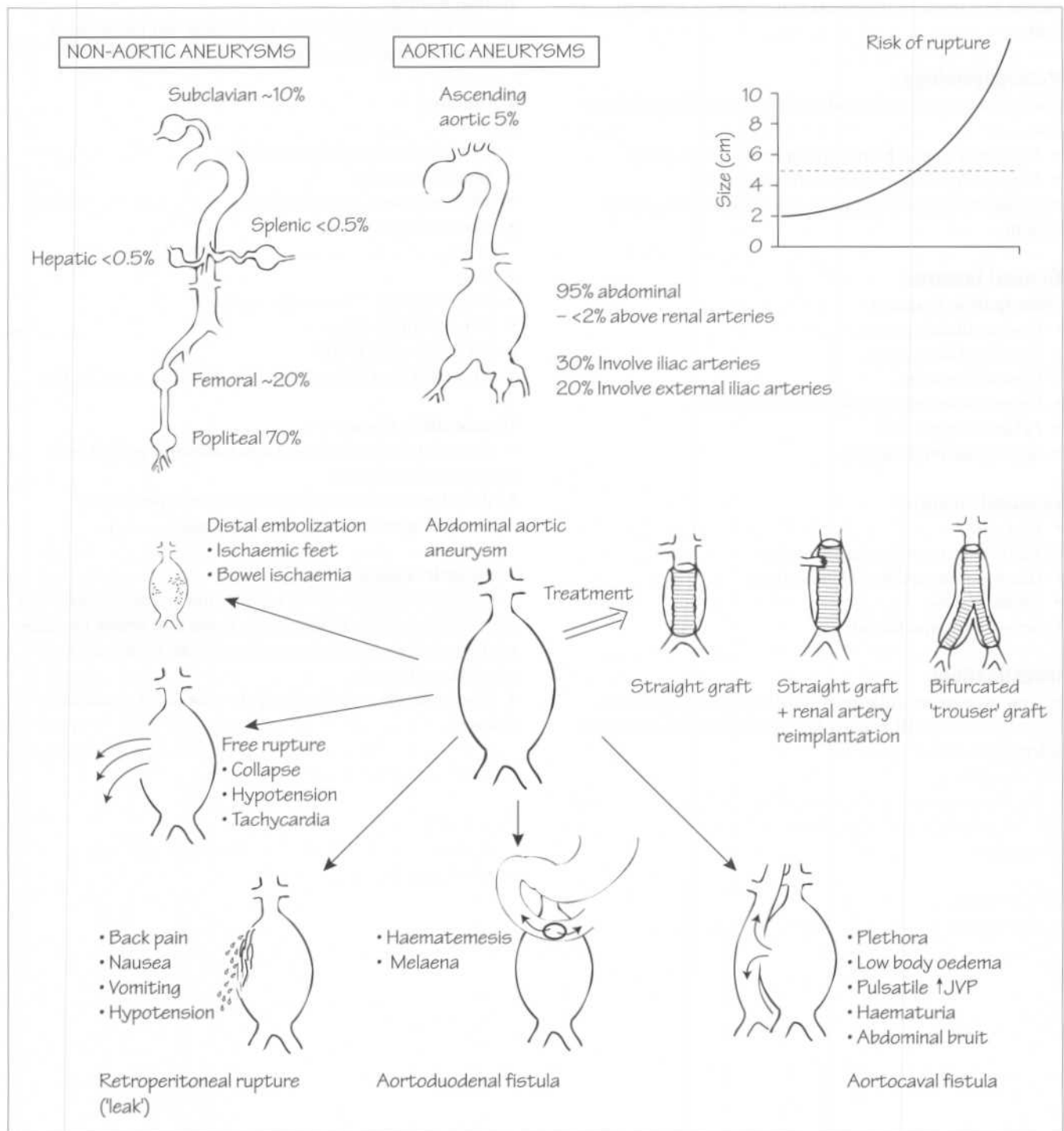
Neuropathic disease

- Control infection with antibiotics effective against both aerobes and anaerobes.
- Wide local excision and drainage of necrotic tissue.
- These measures usually result in healing.

Ischaemic disease

- Formal assessment of the vascular tree by angiography and reconstitution of the blood supply to the foot (either by angioplasty or bypass surgery) must be achieved before the local measures will work.
- After restoration of blood supply treat as for neuropathic disease.

59 Aneurysms



Definition

An *aneurysm* is a permanent localized dilatation of an artery to the extent that the affected artery is 1.5 times its normal diameter. A *pseudo* or *false* aneurysm is an expanding pulsating haematoma in continuity with a vessel lumen. It does not have an epithelial lining.

Sites

Abdominal aorta, iliac, femoral and popliteal arteries. Cerebral and thoracic aneurysms are less common.

Aetiology

- Atherosclerosis.
- Familial (abnormal collagenase or elastase activity).
- Congenital (cerebral (berry) aneurysm).
- Bacterial aortitis (mycotic aneurysm).
- Syphilitic aortitis (thoracic aneurysm).

Risk factors

- Cigarette smoking.
- Hypertension.
- Hyperlipidaemia.

Pathology

- Aneurysms increase in size in line with the law of Laplace ($T = RP$), T = tension on the arterial wall, R = radius of artery, P = blood pressure. Increasing tension leads to rupture.
- Thrombus from within an aneurysm may be a source for peripheral emboli.
- Popliteal aneurysms may undergo complete thrombosis.
- Aneurysms may be fusiform (AAA, popliteal) or saccular (thoracic, cerebral).

Clinical features of AAA

Asymptomatic

- The vast majority have no symptoms and are found incidentally. This has led to the description of an AAA as 'a U-boat in the belly'.

Symptomatic

- Back pain from pressure on the vertebral column.

- Rapid expansion causes flank or back pain.
- Rupture causes collapse, back pain and an ill-defined mass.
- Erosion into IVC causes CCF, loud abdominal bruit, lower limb ischaemia and gross oedema.

Investigations

Detection of AAA

- Physical examination: not accurate.
- Plain abdominal X-ray: aortic calcification.
- Ultrasonography: best way of detecting and measuring aneurysm size.
- CT scan: provides good information regarding relationship between AAA and renal arteries.
- Angiography: not routine for AAA.

Determination of fitness for surgery

- History and examination.
- ECG $\pm$ stress testing.
- Radionuclide cardiac scanning (MUGA or stress thallium scan).
- Pulmonary function tests.
- U+E and creatinine for renal assessment.

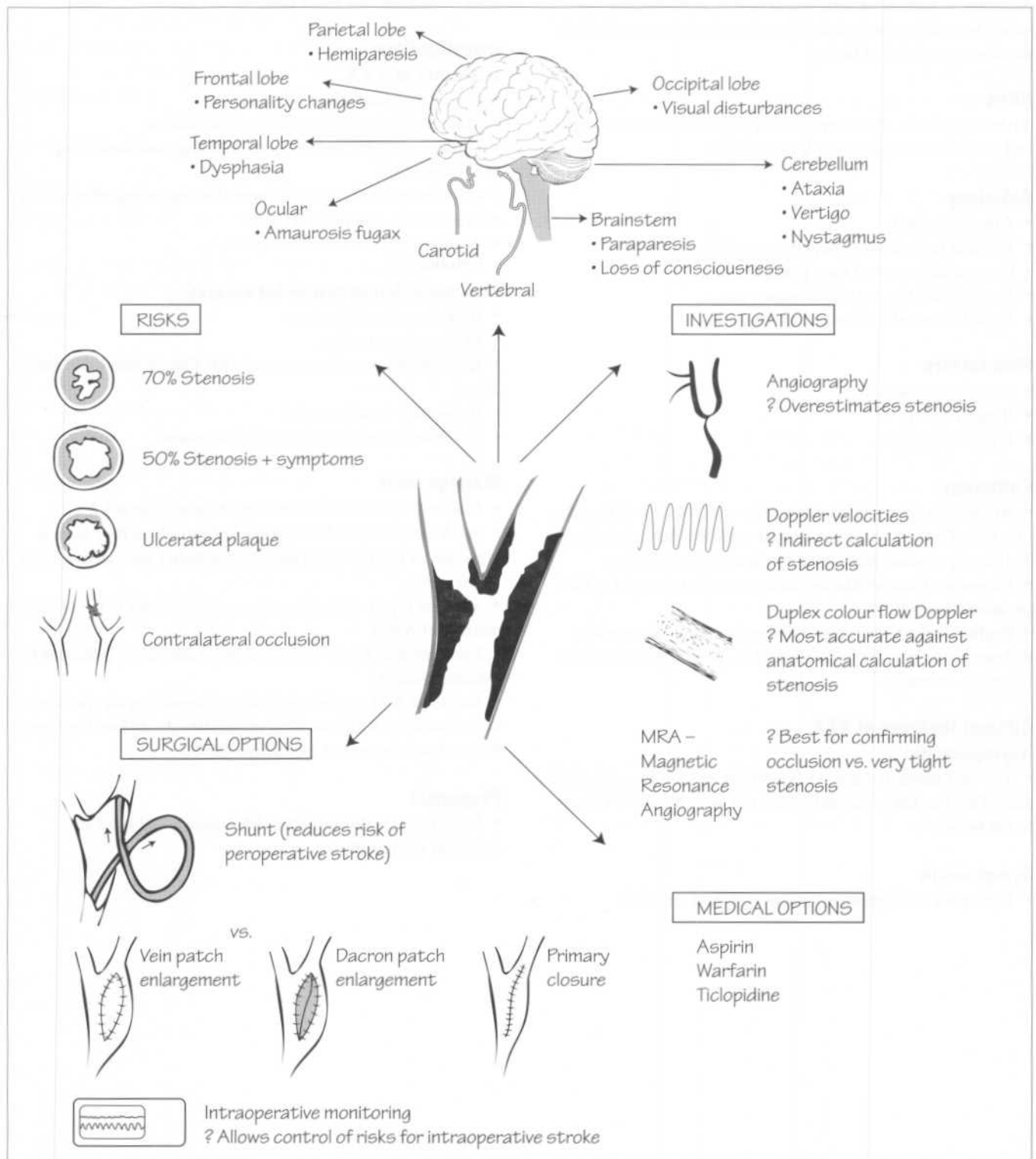
Management

- Surgical repair is the treatment of choice for AAA.
- AAA ≥ 5 cm should be repaired *electively* as they have a high rate of rupture (perioperative mortality for elective AAA repair = 5%).
- Surgical repair with *inlay of a synthetic graft* is the standard method of repair.
- Endovascular repair with graft/stent devices is indicated in selected patients.
- *Ruptured* AAA require immediate surgical repair (perioperative mortality 50%, but 70% of patients die before they get to hospital so that overall mortality = 85%).

Prognosis

- Most patients do well after AAA repair and have an excellent quality of life.

60 Extracranial arterial disease



Definition

Extracranial arterial disease is a common disorder characterized by atherosclerosis of the carotid or vertebral arteries resulting in cerebral–ocular (*stroke*, *TIA*, *amaurosis fugax*) or cerebellar (*vertigo*, *ataxia*, *drop attacks*) ischaemic symptoms.

Epidemiology

Male > female before age 65. Increasing risk with increasing age.

Aetiology

- Atherosclerosis and thrombosis.
- Thromboemboli.
- Fibromuscular dysplasia.

Risk factors

- Cigarette smoking.
- Hypertension.
- Hyperlipidaemia.

Pathophysiology

- The commonest extracranial lesion is an atherosclerotic plaque at the carotid bifurcation. Platelet aggregation and subsequent *platelet embolization* cause ocular or cerebral symptoms.
- Symptoms due to *flow reduction* are rare in the carotid territory, but vertebro-basilar symptoms are usually flow related. Reversed flow in the vertebral artery in the presence of ipsilateral subclavian occlusion leads to cerebral symptoms as the arm ‘steals’ blood from the cerebellum — subclavian steal syndrome.

Clinical features

- Cerebral symptoms (contralateral):
 - motor (weakness, clumsiness or paralysis of a limb);
 - sensory (numbness, paraesthesia);
 - speech related (receptive or expressive dysphasia).
- Ocular symptoms (ipsilateral): amaurosis fugax (transient

loss of vision described as a veil coming down over the visual field).

- Cerebral (or ocular) symptoms may be transitory (a *transient ischaemic attack* is a focal neurological or ocular deficit lasting not more than 24 hours) or permanent (a *stroke*).
- Vertebro-basilar symptoms: vertigo, ataxia, dizziness, syncope, bilateral paraesthesiae, visual hallucinations.
- A *bruit* may be heard over a carotid artery, but it is an unreliable indicator of pathology.

Investigations

- Duplex scanning: B-mode scan and Doppler ultrasonic velocimetry: method of choice for assessing degree of carotid stenosis.
- Carotid angiography: not essential any more prior to surgery.
- CT or MRI brain scan: demonstrate the presence of a cerebral infarct.

Management

Medical therapy

- Aspirin (75 mg/day) inhibits platelet aggregation for the life of the platelet.
- Ticlopidine has a similar action to aspirin.
- Anticoagulation is indicated in patients with cardiac embolic disease.

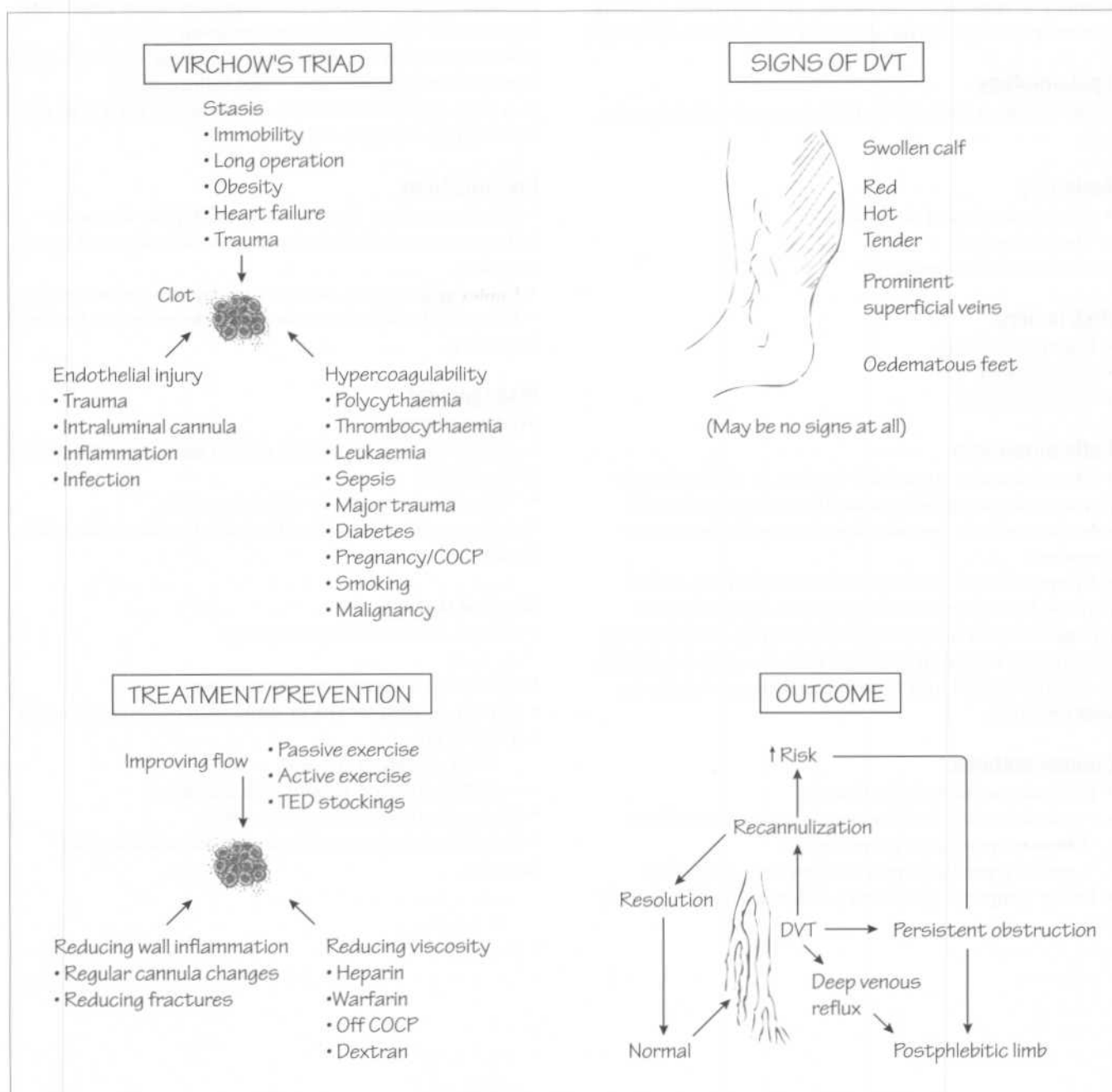
Surgical therapy

- Carotid endarterectomy (+aspirin).

Indications for carotid endarterectomy

- Carotid distribution TIA or stroke with good recovery after 1-month delay:
 - >70% ipsilateral stenosis;
 - >50% ipsilateral stenosis with ulceration.
- Asymptomatic carotid stenosis > 80%.
- Carotid endarterectomy has about a 5% morbidity and mortality.

61 Deep venous thrombosis



Definitions

A *deep venous thrombosis* (DVT) is a condition in which the blood in the deep veins of the legs or pelvis clots. Embolization of the thrombus results in a *pulmonary embolus* (PE) while local venous damage may lead to chronic venous hypertension and the *postphlebotic limb* (PPL).

Epidemiology

DVT is extremely common among medical and surgical patients, affecting 10–30% of all general surgical patients over 40 years who undergo a major operation. PE is a common cause of sudden death in hospital patients (0.5–3.0% of patients die from PE).

Aetiology

Risk factors

- Increasing age > 40 years.
- Immobilization.
- Obesity.
- Malignancy.
- Inflammatory bowel disease.
- Anticoagulant protein (e.g. antithrombin III, protein C, protein S) deficiency.
- Trauma.
- Sepsis.
- Heart disease.
- Pregnancy/oestrogens.

Virchow's triad

- Stasis.
- Endothelial injury.
- Hypercoagulability.

Pathology

- Aggregation of platelets in valve pockets (area of maximum stasis or injury).
- Activation of clotting cascade producing fibrin.
- Fibrin production overwhelms the natural anticoagulant/fibrinolytic system.
- Natural history:
 - complete resolution;
 - PE;
 - PPL.

Clinical features

DVT

- Asymptomatic.
- Calf tenderness.
- Ankle oedema.
- Mild pyrexia.
- Phlegmasia alba/caerulea dolens.

PE

- Substernal chest pain.
- Dyspnoea.
- Circulatory arrest.
- Pleuritic chest pain.
- Haemoptysis.

PPL

- History of DVT.
- Aching limb.
- Leg swelling.
- Venous eczema.
- Venous ulceration.
- Inverted bottle-shaped leg.

Investigations

DVT

- Duplex imaging.
- Ascending venography.

PE

- ECG—S1,Q3,T3.
- Chest X-ray.
- Blood gases.
- Ventilation/perfusion lung scan.
- Pulmonary angiography.

PPL

- Ascending ± descending venography.
- Duplex scanning.
- Plethysmography.
- Ambulatory venous pressure.

Management

Prophylaxis against DVT

Indications

- Presence of risk factors (see above).

Methods

- Mechanical compression (TED) stockings.
- Pharmacological subcutaneous heparin 5000 iu s.c. b.d. (warfarin 1 mg/day, Dextran 70 i.v., 500 ml/day).

Definitive treatment

DVT

- Anticoagulation for 6–8 weeks:
 - i.v. heparin (check efficacy with APTT);
 - warfarin (check efficacy with PT).
- (• Thrombolysis.)
- (• Thrombectomy.)

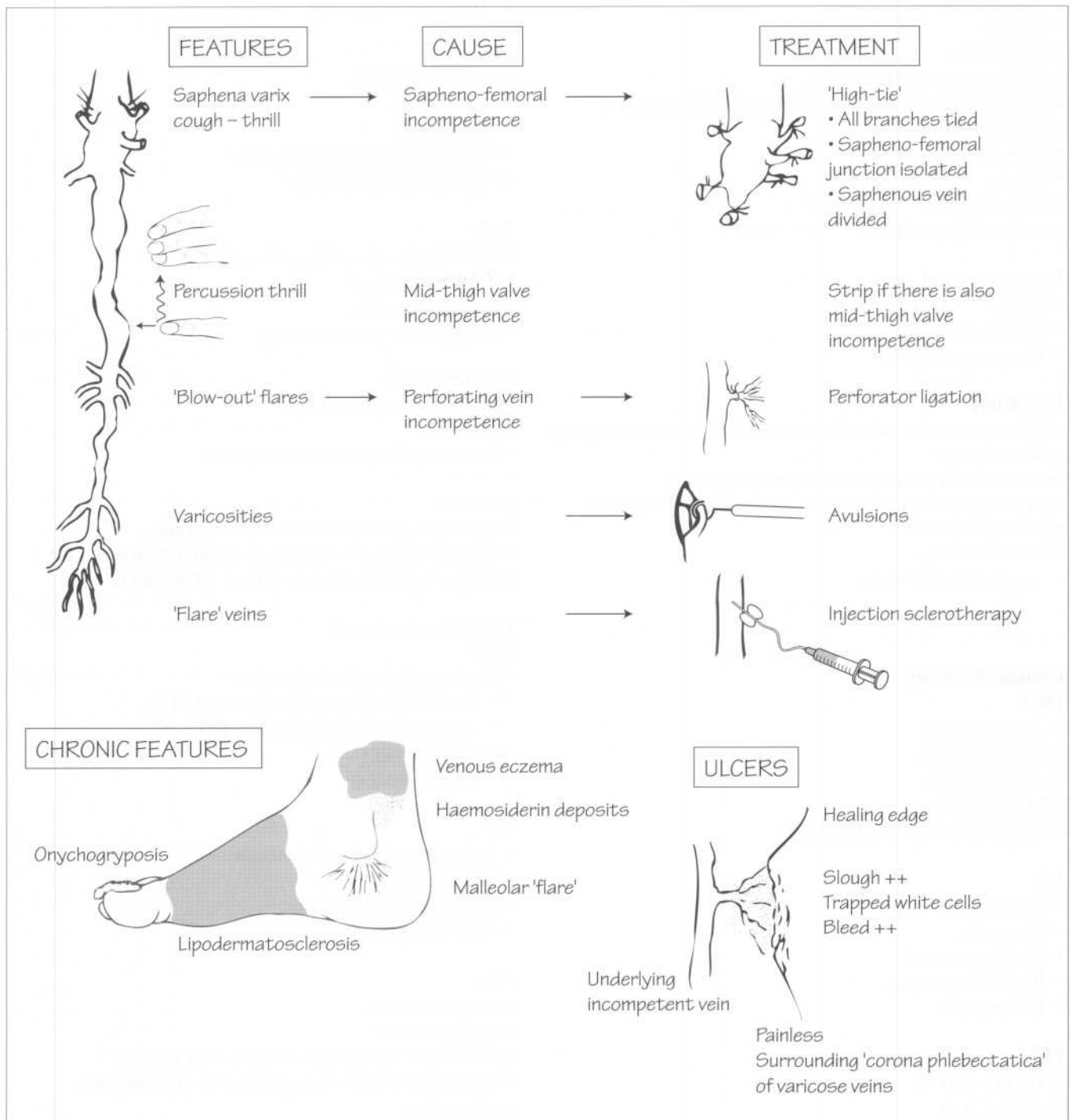
PE

- Anticoagulation for 3–6 months.
- Thrombolysis.
- Pulmonary embolectomy.
- IVC filters for recurrent PE.

PPL

- Limb elevation.
- Compression.
- Four-layer bandaging to achieve ulcer healing.
- Graduated compression stockings to maintain limb compression.
- (• Venous valve reconstruction.)

62 Varicose veins



Definition

Varicose veins are tortuous, dilated prominent superficial veins in the lower limbs, often in the anatomical distribution of the long and short saphenous veins.

Epidemiology

Very common in the Western World, affecting about 50% of the adult population.

Aetiology

- Primary or familial varicose veins.
- Pregnancy (progesterone causes passive dilatation of veins).
- Secondary to postphlebitic limb (perforator failure).
- Congenital:
 - Klippel–Trenaunay syndrome;
 - Parkes–Weber syndrome.
- Iatrogenic: following formation of an arteriovenous fistula.

Pathophysiology

Venous valve failure, usually at the sapheno-femoral junction (and sometimes in perforating veins), results in increased venous pressure in the long saphenous vein with progressive vein dilatation and further valve disruption.

Clinical features

- Asymptomatic.
- Cosmetic appearance.
- | | | |
|---|---|---|
| <ul style="list-style-type: none">• Dull aching leg pain• Heaviness in the leg | } | Symptoms worse in the evening or on standing for long periods |
|---|---|---|
- Itching and eczema.
- Superficial thrombophlebitis.
- Bleeding.

- Saphena varix.
- Ulceration.

Investigations

- Clinical assessment by Trendelenburg tourniquet tests.
- Doppler velocimetry.
- Duplex scanning.

Management

Symptomatic veins should be treated.

General

- Avoid long periods of standing.
- Elevate limbs.
- Wear support hosiery.

Specific

Injection sclerotherapy with sodium tetradecyl (STD)

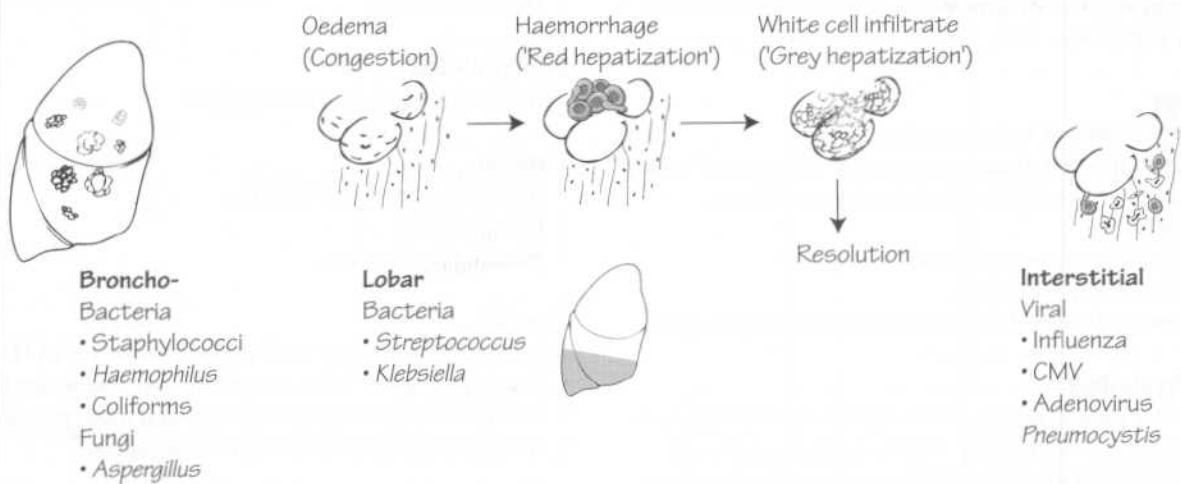
- Suitable for small veins and usually only below the knee.
- Patients are encouraged to walk several miles per day.
- Anaphylaxis and local ulceration may occur.

Surgical ablation

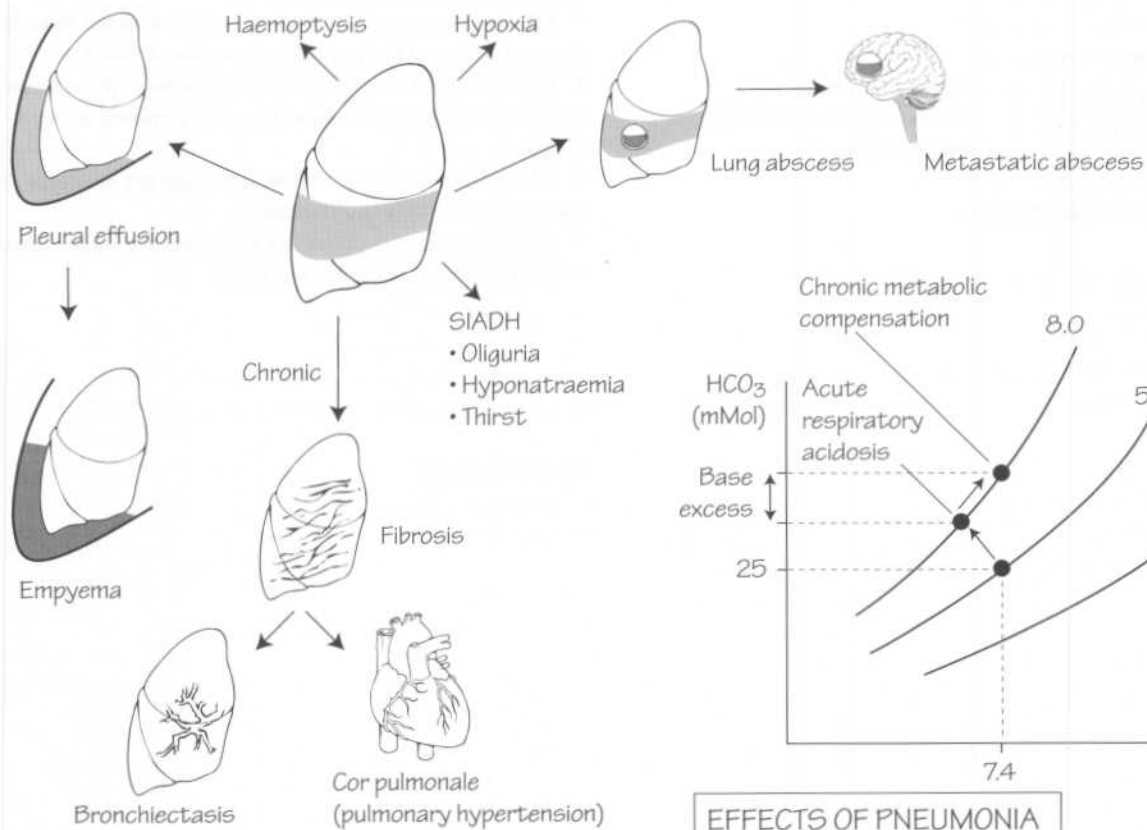
- With the patient standing, the dilated veins are carefully marked with an indelible marker.
- The saphenous vein is surgically disconnected from the femoral vein and the perforators are also ablated.
- The elongated veins are removed via multiple stab incisions and long segments above the knee are removed using a 'vein stripper'.
- Postoperatively compression stockings are worn for several weeks and exercise is encouraged.
- Surgery is the most effective treatment for large varicose veins, but recurrence rates are high.

63 Pulmonary collapse and pneumonia

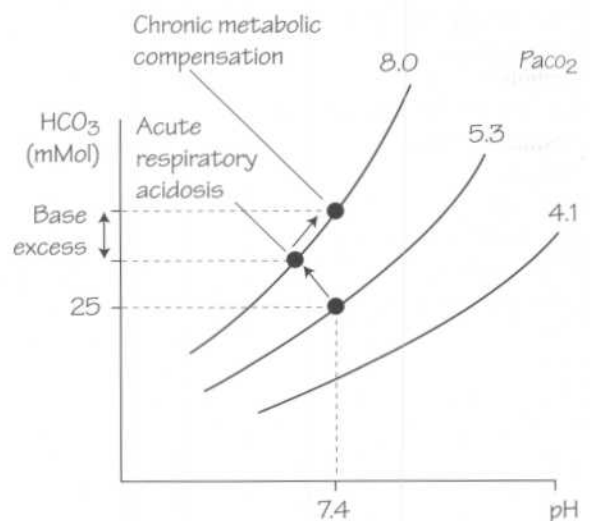
TYPES OF PNEUMONIA



COMPLICATIONS OF PNEUMONIA



EFFECTS OF PNEUMONIA



Definitions

Pulmonary collapse or *atelectasis* results from alveolar hypoventilation such that the alveolar walls collapse and become de-aerated. *Pneumonia* is an infection with consolidation of the pulmonary parenchyma.

Aetiology/pathophysiology

Postoperatively patients frequently develop atelectasis, which may develop into a pneumonia.

Pulmonary collapse

- Proximal bronchial obstruction.
- Trapped alveolar air absorbed.
- Common in smokers.
- Common with chronic bronchitis.

Pneumonia

- Infection with micro-organisms.
- Bacterial: *Streptococcus pneumoniae*, *Staphylococcus*, *Haemophilus influenzae*.
- Viral: influenza, CMV.
- Fungal: *Candida*, *Aspergillus*.
- Protozoal: *Pneumocystis*, *Toxoplasma*.

Predisposing factors

- *Secretional airway obstruction*.
- Bronchorrhoea post-surgery.
- Mucus plugs block bronchi.
- Impaired ciliary action.
- Postoperative pain prevents effective coughing.
- *Organic airway obstruction*.
- Bronchial neoplasm.

Patients prone to severe pneumonia

- The elderly.
- Alcoholics.
- Chronic lung and heart disease.
- Debilitated patients.
- Diabetes.
- Post-CVA.
- Immunodeficiency states.
- Post-splenectomy.
- Atelectasis post-surgery.

Clinical features

Pulmonary collapse

- Pyrexia.
- Tachypnoea.
- Diminished air entry.
- Bronchial breathing.

Pneumonia

- Respiratory distress.
- Painful dyspnoea.
- Tachypnoea.
- Productive cough $\pm$ haemoptysis.
- Hypoxia — confusion.
- Diminished air entry.
- Consolidation.
- Pleural rub.
- Cyanosis.

Investigations

- Chest X-ray: consolidation, pleural effusion, interstitial infiltrates, air–fluid cysts.
- Sputum culture: essential for correct antibiotic treatment.
- Blood gas analysis: diagnosis of respiratory failure.

Management

Prophylaxis

- Preoperative deep-breathing exercises.
- Incentive spirometry.
- Adequate analgesia postoperatively.
- Early ambulation.

Treatment

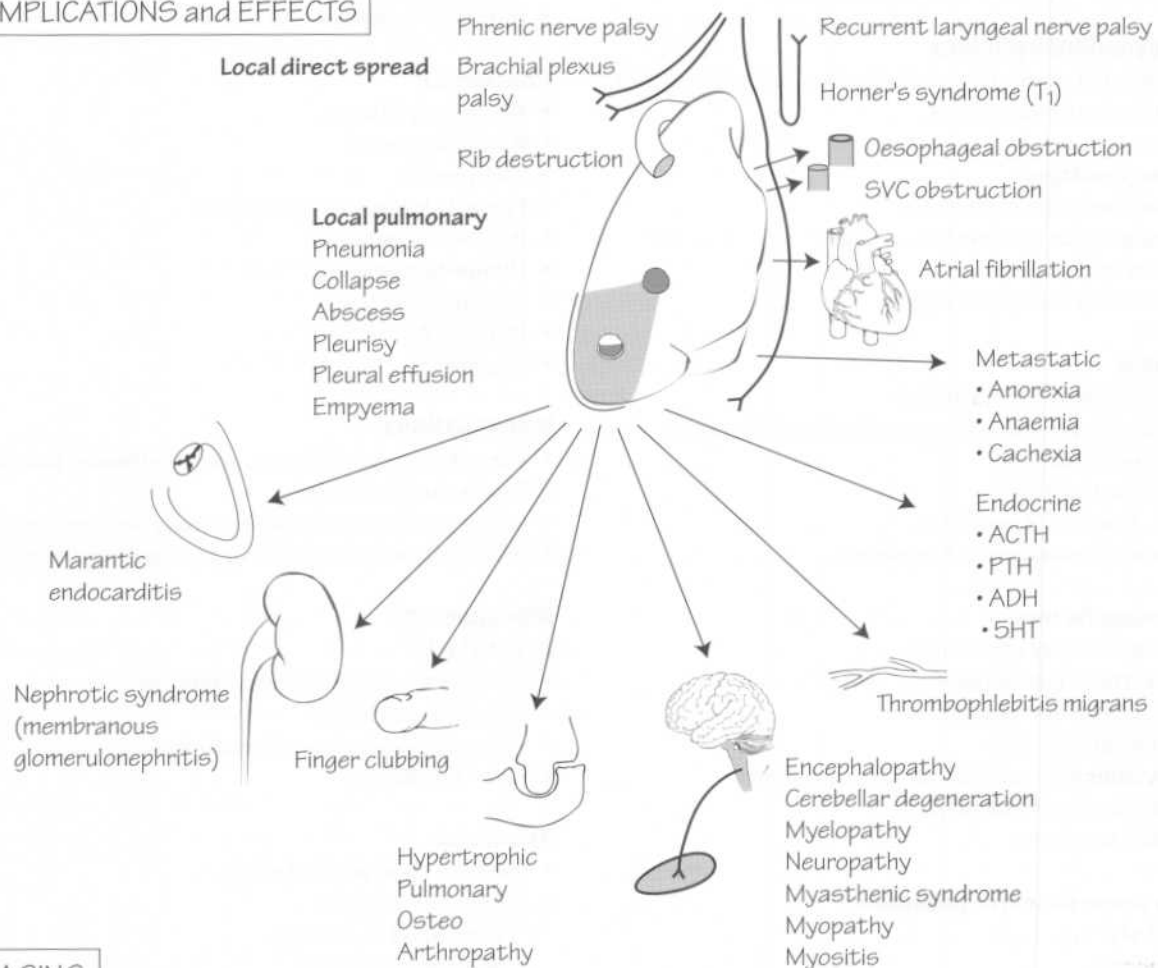
- Intensive chest physiotherapy.
- Respiratory support:
 - humidified O₂ therapy;
 - adequate hydration;
 - bronchodilators if bronchospasm is present.
- Specific antimicrobial therapy based on sputum culture.

Complications

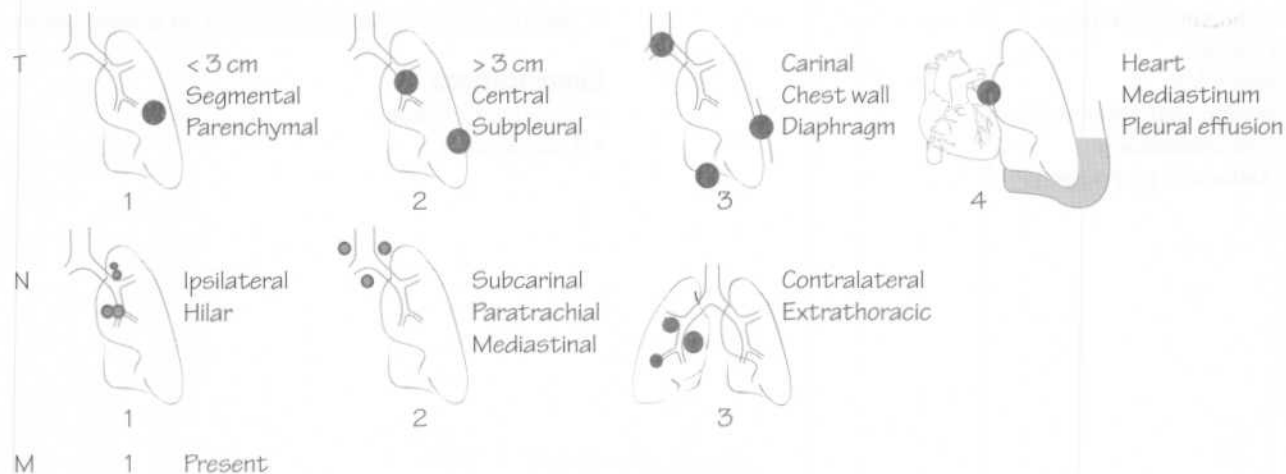
- Respiratory failure.
- Lung abscess.

64 Bronchial carcinoma

COMPLICATIONS and EFFECTS



STAGING



Definition

Malignant lesion of the lung.

Epidemiology

Male/female 5:1. Uncommon before age 50. Most patients are in their 60s. Accounts for 40 000 deaths per annum in the UK.

Aetiology

The following are predisposing factors.

- Cigarette smoking.
- Air pollution.
- Exposure to uranium, chromium, arsenic, haematite and asbestos.

Pathology

Histology

- Squamous carcinoma 50%.
- Small-cell (oat-cell) carcinoma 35%.
- Adenocarcinoma 15%.

Spread

- Direct to pleura, recurrent laryngeal nerve, pericardium, oesophagus, brachial plexus.
- Lymphatic to mediastinal and cervical nodes.
- Haematogenous to liver, bone, brain, adrenals.
- Transcoelomic pleural seedlings and effusion.

Clinical features

- History of tiredness, cough, anorexia, weight loss.
- Productive cough with purulent sputum.
- Haemoptysis.
- Finger clubbing.
- Bronchopneumonia (secondary infection of collapsed lung segment distal to malignant bronchial obstruction).
- Pleuritic pain.
- Neuropathy, myopathy, hypertrophic osteoarthropathy.
- Endocrine syndromes (ACTH is secreted by oat-cell

tumours, parathormone is secreted by squamous cell carcinoma — hypercalcaemia).

- Pancoast's tumour (apical tumour invading sympathetic trunk and brachial plexus) — Horner's syndrome, brachial neuralgia, paralysis of upper limb.
- Dysphagia and broncho-oesophageal fistula.
- Superior vena caval obstruction.

Investigations

Diagnostic

- Chest X-ray — PA and lateral (lung opacity, hilar lymphadenopathy).
- Sputum cytology.
- Bronchoscopy and cytology.

Assess operability

- CT scan of thorax/abdomen.
- Bone scan.
- Liver ultrasound.
- Lung function test.
- Mediastinoscopy.

Management

Surgery

- Indicated only when tumour is confined to one lobe or lung, no evidence of secondary deposits, carina is tumour free on bronchoscopy.
- Operation: lobectomy or pneumonectomy.

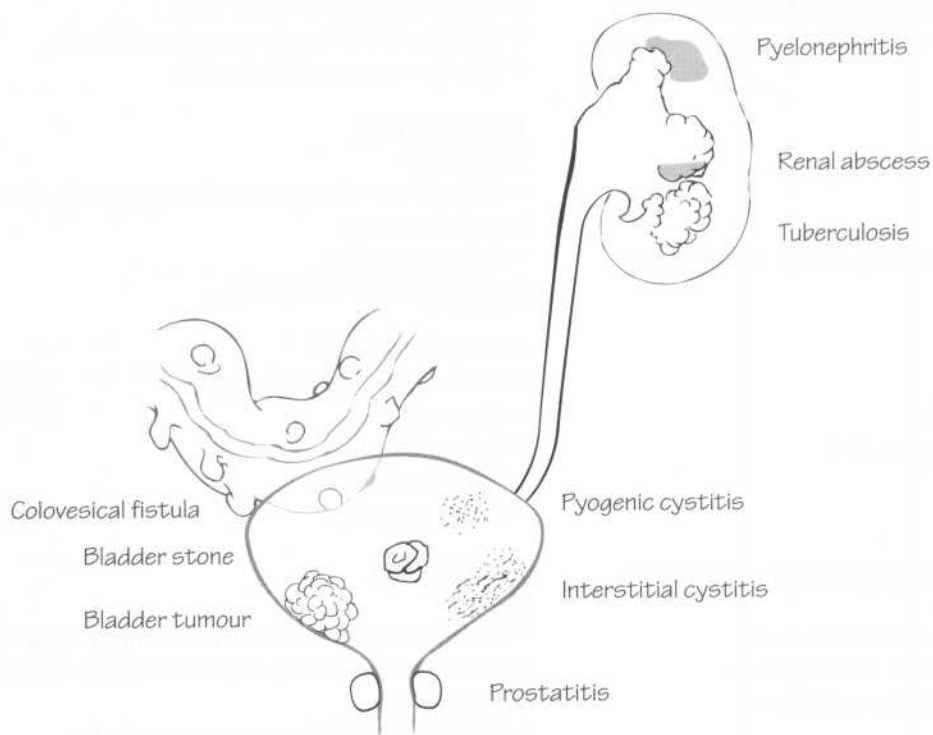
Palliation

- Radiotherapy (small-cell carcinoma most radiosensitive): stop haemoptysis, relieve bone pain from secondaries, relieve superior vena caval obstruction.

Prognosis

- Following 'curative' resection 5-year survival rates are approximately 20–30%, but overall 5-year survival is only about 6%.

65 Urinary tract infection



Definitions

A *urinary tract infection* (UTI) is a documented episode of significant bacteriuria (i.e. an infection with a colony count of $>100\,000$ organisms per ml) which may affect the upper (*pyelonephritis*, *renal abscess*) or the lower (*cystitis*) urinary tract or both.

Epidemiology

UTI is a very common condition in general practice (usually *Escherichia coli*) and accounts for 40% of hospital-acquired (*nosocomial*) infections (often *Enterobacter* or *Klebsiella*).

Risk factors

- Urinary tract obstruction.
- Instrumentation of urinary tract (e.g. indwelling catheter).
- Neurogenic bladder.
- Immunosuppression.
- Diabetes mellitus.
- Vesicoureteric reflux.
- Pregnancy.

Pathology

- Ascending infection: most UTIs caused in this way (bacteria from GI tract colonize lower urinary tract).
- Haematogenous spread: infrequent cause of UTI (seen in i.v. drug users, bacterial endocarditis and TB).

Clinical features

Upper urinary tract infection

- Fever.
- Rigors/chill.
- Flank pain.
- Malaise.
- Anorexia.
- Costo-vertebral angle and abdominal tenderness.

Lower urinary tract infection

- Dysuria.
- Frequency.
- Urgency.
- Suprapubic pain.

- Haematuria.
- Scrotal pain (epididymo-orchitis) or perineal pain (prostatitis).

Investigations

- Gram stain and culture of a 'clean-catch' urine specimen before antibiotics have been given. Usual organisms are *E. coli*, *Enterobacter*, *Klebsiella*, *Proteus* (suggests presence of urinary calculi).

Upper urinary tract infection

- FBC.
- U + E.
- Serum creatinine.
- Renal ultrasound.
- IVU.
- CT scan.
- Isotope scan (DPTA, DMSA).

Lower urinary tract infection

- FBC.
- Cystoscopy only if haematuria.
- If obstruction is present ultrasound scan, IVU and cystoscopy may be needed.

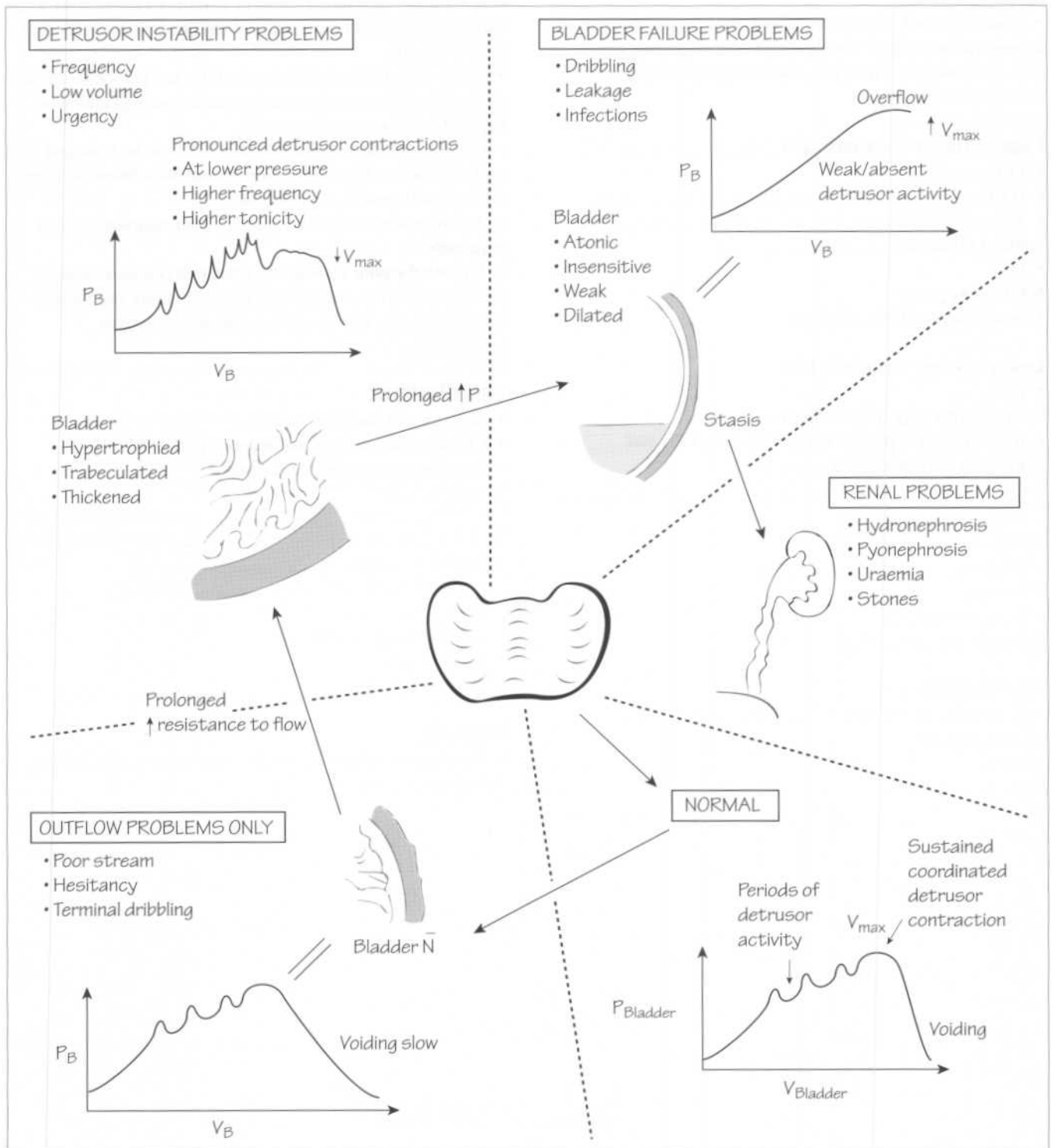
Management

- The principles of management are to treat the infection with an appropriate antibiotic based on urine culture results and deal with any underlying cause (e.g. relieve obstruction). High fluid intake should be encouraged and potassium citrate may relieve dysuria.
- Upper tract UTIs, epididymo-orchitis and prostatitis require i.v. antibiotic therapy. Agents commonly used: gentamicin, cephalosporin or co-trimoxazole.
- Cystitis and uncomplicated lower UTI can be managed with oral antibiotics. Agents commonly used: trimethoprim, ampicillin, nitrofurantoin, cephalosporin.
- An abscess will require drainage either radiologically or surgically.
- If there is a poor response to treatment consider unusual urinary infections: tuberculosis (sterile pyuria), candiduria, schistosomiasis, *Chlamydia trachomatis*, *Neisseria gonorrhoeae*.

Complications

- Bacteraemia and septic shock.
- Chronic and xanthogranulomatous pyelonephritis.
- Renal and perinephric abscesses.

66 Benign prostatic hypertrophy



Definition

Benign prostatic hypertrophy is a condition of unknown aetiology characterized by an increase in size of the inner zone of the prostate gland.

Epidemiology

Present in 50% of 60–90-year-old men.

Pathophysiology

- Microscopic stromal nodules develop around the peri-urethral glands.
- Glandular hyperplasia originates around these nodules.
- As the gland increases in size, it compresses the urethra leading to urinary tract obstruction.

Clinical features

- Weak stream.
- Hesitancy.
- Intermittency.
- Dribbling.
- Straining to void.
- Acute urinary retention.
- Palpable (or percussible) bladder.
- Enlarged smooth prostate on digital rectal examination.
- Frequency.
- Urgency.
- Nocturia.
- Dysuria.
- Urge incontinence.
- Overflow incontinence.

Investigations

- Urinalysis for evidence of infection or haematuria.
- Urine culture.
- FBC.
- U + E.

- Serum creatinine.
- Uroflowmetry.
- Residual volume measurement (normal < 100 ml).
- Ultrasonography of kidneys and bladder.
- Transrectal ultrasound to determine prostate size.
- IVU.
- Cystoscopy.

Management

Medical

- α -Adrenergic blockers (e.g. phenoxybenzamine, prazosin).
- Anti-androgens acting selectively at prostatic cellular level (e.g. finasteride).
- Intermittent self-catheterization.
- Balloon dilatation and stenting of prostate.

Surgical

- Majority of patients are treated surgically.
- Surgical removal of the adenomatous portion of the prostate.
- TURP with electrocautery or laser.
- Open prostatectomy which may be transvesical or retropubic.

Complications of surgical treatment

- TURP syndrome: in 2% of patients absorption of irrigation fluid via venous sinuses in the prostate causes hyponatraemia and metabolic acidosis.
- Postoperative haemorrhage and clot retention.
- Urinary tract infection.
- Retrograde ejaculation.
- Incontinence.
- Urethral stricture.

Prognosis

- The majority of patients have a very good quality of life after prostatectomy.

67 Renal calculi

TYPES

60% Oxalate



Spiky
Hard
Discoloured by blood

30%+ Phosphate



Soft
Chalky
Faceted
Large 'staghorn' fragile

5% Urate



Some pale yellow/brown
Hard

FEATURES

Renal destruction
• Pyonephrosis
• Pyelonephritis
• Hydronephrosis

Pelvi-ureteric obstruction

• Renal colic
• Haematuria
• Hydronephrosis
• Pyelonephritis

Bladder irritation

• Haematuria
• Frequency
• Pain

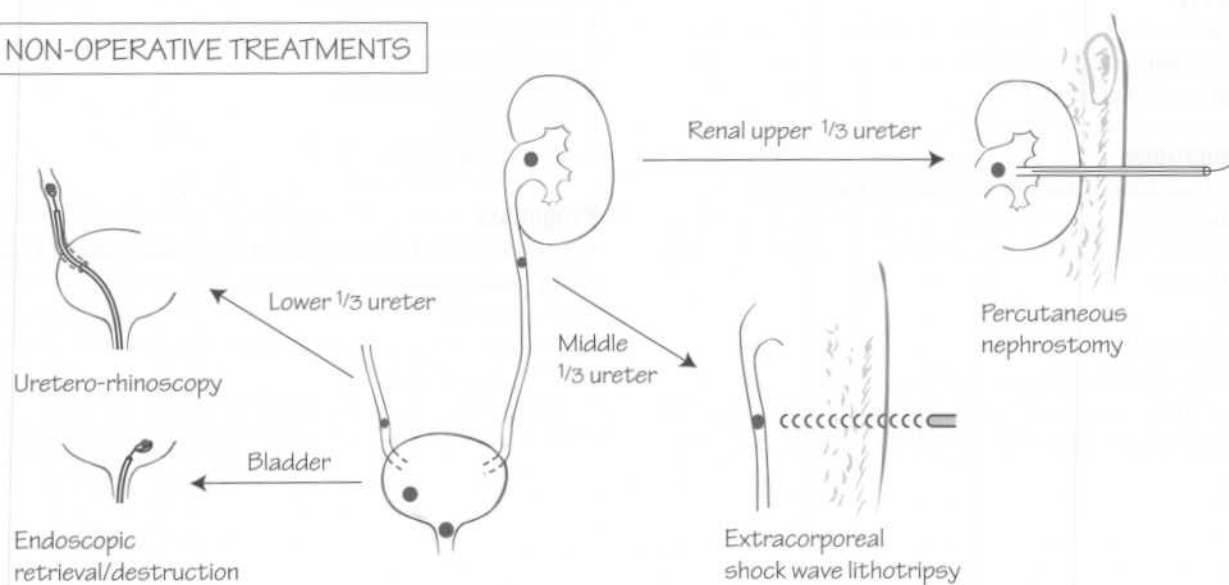
Bladder outflow obstruction

• Acute retention
• Haematuria

Vesico-ureteric obstruction

• Renal colic
• Haematuria
• Hydronephrosis

NON-OPERATIVE TREATMENTS



Definition

Renal stones are concretions formed by precipitation of various urinary solutes in the urinary tract. They contain calcium oxalate (60%), phosphate as a mixture of calcium, ammonium and magnesium phosphate (triple phosphate stones are infective in origin) (30%), uric acid (5%) and cystine (1%).

Epidemiology

Male > female. Early adult life. Among Europeans prevalence is 3%.

Pathogenesis

- Hypercalciuria: 65% of patients have idiopathic hypercalciuria.
- Nucleation theory: a crystal or foreign body acts as a nucleus for crystallization of supersaturated urine.
- Stone matrix theory: a protein matrix secreted by renal tubular cells acts as a scaffold for crystallization of supersaturated urine.
- Reduced inhibition theory: reduced urinary levels of naturally occurring inhibitors of crystallization.
- Infection: staghorn triple phosphate calculi are formed by the action of urease-producing organisms (*Proteus*, *Klebsiella*), which produce ammonia and render the urine alkaline. Schistosomiasis predisposes to bladder calculi (and cancer).

Pathology

- Staghorn calculi are large, fill the renal pelvis and calices, and lead to recurring pyelonephritis and renal parenchymal damage.
- Other stones are smaller, ranging in size from a few millimetres to 1–2 cm. They cause problems by obstructing the urinary tract, usually the ureter. Caliceal stones may cause haematuria and bladder stones may cause infection. Chronic bladder stones predispose to the unusual squamous carcinoma of the bladder.

Clinical features

- Caliceal stones may be asymptomatic.
- Staghorn calculi present with loin pain and upper tract UTI.
- Ureteric colic—severe colicky pain radiating from the loin

to the groin and into the testes or labia associated with gross or microscopic haematuria.

- Bladder calculi present with sudden interruption of urinary stream, perineal pain and pain at the tip of the penis.

Investigations

- FBC, U + E, serum creatinine, calcium, phosphate, urate, proteins and alkaline phosphatase.
- Urine microscopy for haematuria and crystals.
- Urine culture.
- Plain abdominal X-ray, 90% of renal calculi are radio-opaque.
- IVU confirms the presence and identifies the position of the stone in the genito-urinary tract.
- A renogram may be indicated with staghorn calculi to assess renal function.
- 24-hour urine collection when patient is at home in normal environment.
- Stone analysis.

Management

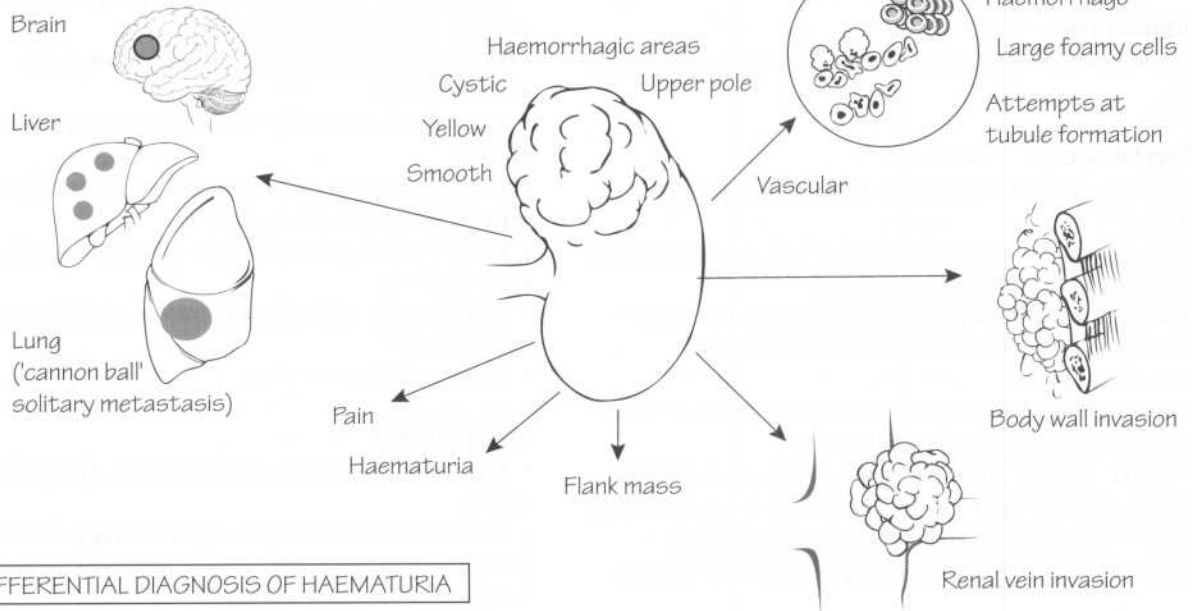
- Pain relief for ureteric colic: pethidine, Voltarol. High fluid intake.
- 80% of ureteric stones pass spontaneously. Stones of <4 mm in diameter almost always pass, >6 mm almost never.
- Indications for intervention:
 - kidney stones: symptomatic, obstruction, staghorn;
 - ureteric stones: failure to pass, large stone, obstruction, infection;
 - bladder: all stones.

Interventional procedures

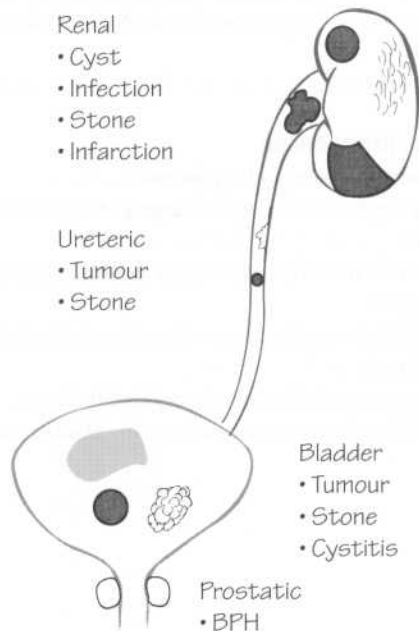
- ESWL for small/medium kidney stones.
- Percutaneous nephrolithotomy for large kidney stones and staghorn calculi.
- ESWL or contact lithotripsy for upper ureteric stones (above pelvic brim).
- Contact lithotripsy or extraction with a dormia basket for lower ureteric stones.
- Open surgery: ureterolithotomy or nephrolithotomy.
- Mechanical lithotripsy or open surgery for bladder stones.

68 Renal cell carcinoma

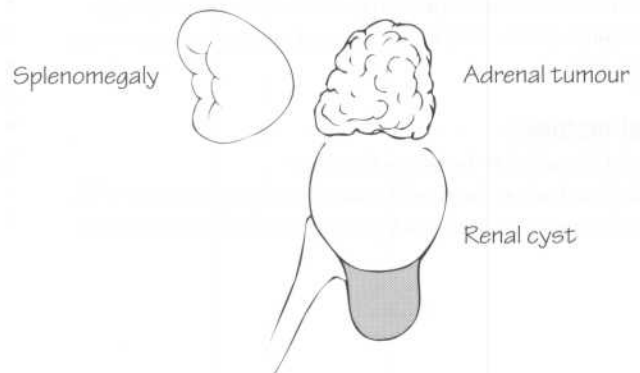
METASTASES



DIFFERENTIAL DIAGNOSIS OF HAEMATURIA



DIFFERENTIAL DIAGNOSIS OF FLANK MASS



Definitions

Malignant lesion (*adenocarcinoma*) of the kidney (also known as *hypernephroma* and *Grawitz tumour*).

Epidemiology

Male/female 2:1. Uncommon before age 40. Accounts for 2–3% of all tumours in adults and 85% of all renal tumours. (The other renal tumours are urothelial tumours, Wilms' tumour and sarcomas.)

Aetiology

The following are predisposing factors.

- Diet: high intake of fat, oil and milk.
- Toxic agents: lead, cadmium, asbestos, petroleum by-products.
- Smoking.
- Genetic factors: oncogene on short arm of chromosome 3, HLA antigen BW-44 and DR-8.
- Other diseases: von Hippel–Lindau syndrome, adult polycystic disease.

Pathology

Histology

- Adenocarcinoma (cell of origin is the proximal convoluted tubular cell).

Staging

- TNM staging.
- Flocks and Kadesky stages I–IV.
 - Stage I: tumour confined to kidney.
 - Stage II: tumour extends through capsule.
 - Stage III: tumour to renal vein, nodes or through Gerota's fascia.
 - Stage IV: distant metastases or invasion of adjacent organs.

Spread

- Direct into renal vein and perirenal tissue.
- Lymphatic to periaortic and hilar nodes.
- Haematogenous to lung, bone and contralateral kidney.

Clinical features

- Triad of haematuria (50–60%), flank pain (35–40%), palpable abdominal mass (25–45%). All three are present in <10% of patients.
- Anaemia, weight loss, PUO.
- Hypertension, erythrocytosis.
- Hypercalcaemia, ectopic hormone production (ACTH, ADH).
- Liver dysfunction (raised enzymes and prolonged PT) in the absence of metastatic disease.
- Renal carcinoma is one of the 'great mimics' of medicine.

Investigations

- FBC.
- ESR.
- U + E.
- LFTs.
- Urine culture.
- Abdominal ultrasound: assess renal mass and IVC.
- Contrast-enhanced CT scan: assess renal mass, fixity, nodes.
- IVU: image renal outline.
- Cavagram and echocardiogram: assess IVC and right atrium.

Management

Surgery

- Offers best chance for patients with renal carcinoma.
- Remove kidney, renal vessels, upper ureter, adrenal and Gerota's fascia.
- Isolated lung metastases should also be removed surgically.

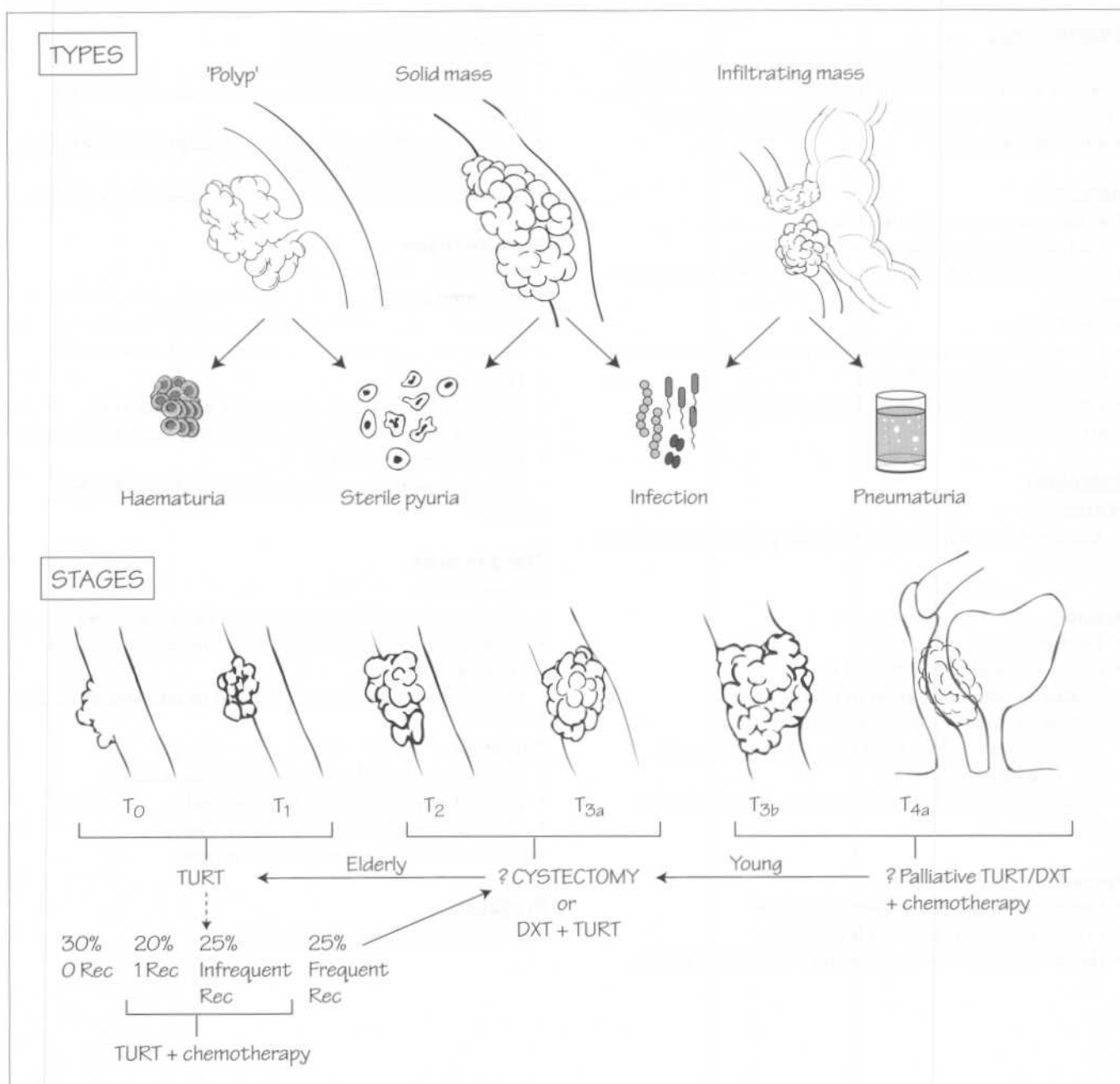
Palliation

- Renal artery embolization (may stop haematuria).
- Chemotherapy (only 10% response rate).
- Hormone therapy (only 5% response rate).
- Immunotherapy (currently under review).

Prognosis

- Overall survival is 40% at 5 years.

69 Carcinoma of the bladder



Definition

Malignant lesion of the bladder.

Epidemiology

Male > female. Uncommon before age 50. Increasing incidence of bladder cancer in recent years. Death rate is 7.6/100 000.

Aetiology

The following are predisposing factors.

- Exposure to carcinogens in rubber industry (1- and 2 naphthylamine, benzidine, aminobiphenyl).
- Smoking, tryptophan metabolites, phenacitan.
- Schistosomiasis and bladder stones.

Pathology

Histology

- TCC.
- Squamous cell carcinoma (rare).
- Adenocarcinoma (rare).

Staging for TCC

Superficial tumours	T _{IS}	Carcinoma <i>in situ</i>
	T _a	Tumour confined to urothelium
Invasive tumours	T ₁	Lamina propria involved
	T ₂	Superficial muscle invasion
	T _{3a}	Deep muscle invasion
Fixed tumours	T _{3b}	Serosal involvement
	T _{4a}	Invasion of prostate, uterus or vagina
	T _{4b}	Fixation to pelvic wall

Spread

- Direct into pelvic viscera (prostate, uterus, vagina, colon, rectum).
- Lymphatic to periaortic nodes.
- Haematogenous to liver and lung.

Clinical features

- Painless intermittent haematuria (95%).
- Dysuria or frequency (10%).

Investigations

- Urine cytology.
- IVU.
- Cystourethroscopy.
- FBC.
- U + E.

- Creatinine.
- Ultrasound.
- CT scan.

Management

Depends on stage of tumour.

Carcinoma *in situ* (T_{IS})

- Intravesical chemotherapy for isolated carcinoma-*in-situ* and associated with papillary tumours.
- Cystourethrectomy for malignant cystitis.

Superficial tumours (T_a, T₁)

- TUR and follow-up cystoscopy.
- If recurrences or increased risk of invasion (large tumours, multiple tumours, severe dysplasia or carcinoma-*in-situ*) intravesical chemotherapy (thiotepa, epodyl, adriamycin, mitomycin-C, BCG).

Invasive tumours (T₂, T₃)

- TUR + radical radiotherapy; or
- radical cystectomy (and urinary diversion, e.g. by ileal conduit).

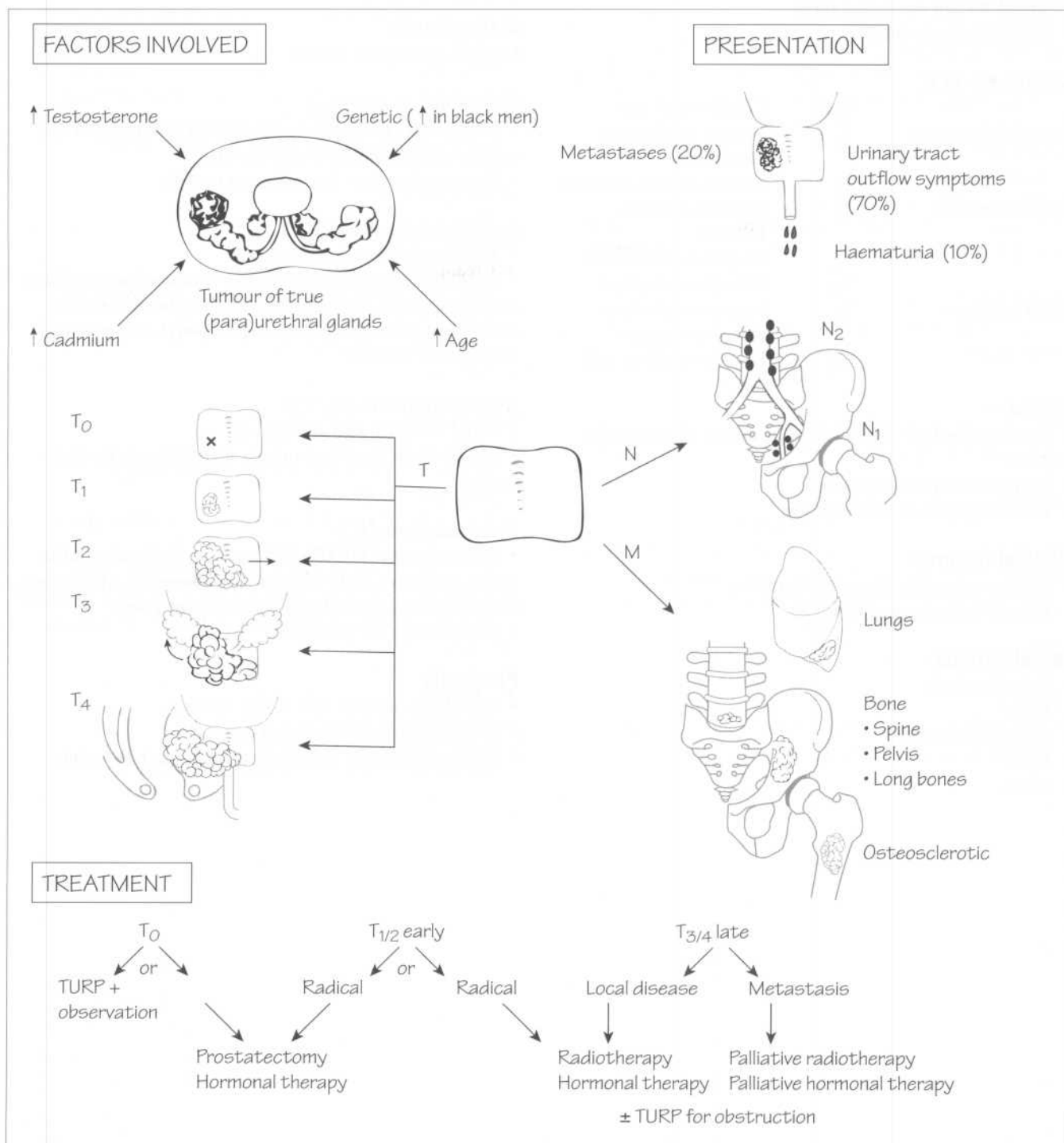
Fixed tumours (T₄)

- Chemotherapy: MVAC (methotrexate, vinblastine, adriamycin, cisplatin), CMV (cisplatin, methotrexate, vinblastine), Cisca (cisplatin, cyclophosphamide, adriamycin).
- Radiotherapy for palliation.

Prognosis

- Superficial tumours 75% 5-year survival.
- Invasive tumours 10% 5-year survival.
- Fixed tumours and metastases median survival 1 year.

70 Carcinoma of the prostate



Definition

Malignant lesion of the prostate gland.

Epidemiology

Uncommon before age 60. Eighty per cent of prostate cancers are clinically undetected (latent carcinoma) and are only discovered on autopsy. The true incidence of this disease is considerably higher than the clinical experience would indicate.

Aetiology

- Increasing age.
- More common in black men.
- Hormonal factors: prostate cancer growth is enhanced by testosterone and inhibited by oestrogens or anti-androgens.

Pathology

Prostatic tumours are multicentric and located in the periphery of the gland.

Histology

- Adenocarcinoma arising from glandular epithelium.
- Gleason grading (2–10) is used to grade differentiation.

Staging

	T ₀	Unsuspected
Localized	T ₁	Localized to one lobe of prostate
	T ₂	Spread within prostate
Local spread	T ₃	Spread to seminal vesicles
	T ₄	Spread to pelvic wall
	T _{1–4} , M ₁	Metastatic disease

Spread

- Direct into remainder of gland and seminal vesicles.
- Lymphatic to iliac and periaortic nodes.

- Haematogenous to bone (usually osteosclerotic lesions), liver, lung.

Clinical features

- Bladder outflow obstruction (poor stream, hesitancy, nocturia).
- Symptoms of advanced disease (ureteric obstruction and hydronephrosis or bone pain from metastases, classically worse at night).
- Nodule or mass detected on rectal examination.

Investigations

- FBC.
- U + E.
- Creatinine.
- Specific markers — PSA, alkaline and acid phosphatase.
- Transrectal ultrasound.
- Needle biopsy of the prostate.
- Bone scan.

Management

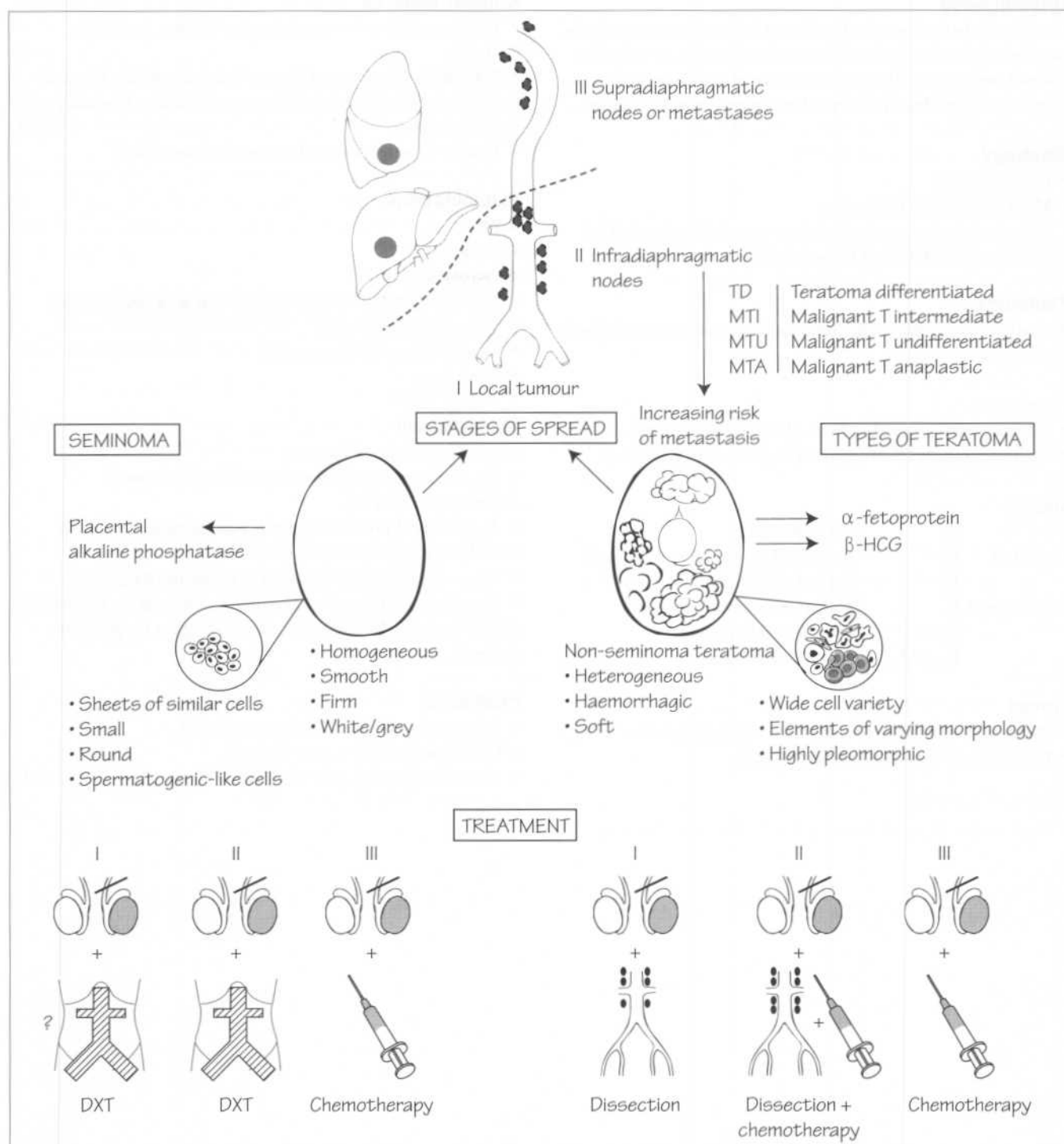
Depends on stage of tumour.

- T₀: observation, repeated digital (or ultrasound) examination and PSA.
- T₁₊₂: radical prostatectomy or radical radiotherapy, or interstitial radiation with ¹²⁵I or ¹⁹⁸Au.
- T₃₊₄: external beam radiation ± hormonal therapy.
- Metastatic: hormonal manipulation, bilateral orchidectomy, stilboestrol, LH-RH agonists, anti-androgens (cyproterone acetate).

Prognosis

- Localized tumours 80% 5-year survival.
- Local spread 40% 5-year survival.
- Metastases 20% 5-year survival.

71 Testicular cancer



Definition

Malignant lesion of the testis.

Epidemiology

Age 20–40 years. Commonest solid tumours in young males.

Aetiology

- Cryptorchidism—50-fold increase in risk of developing testicular cancer. Risk is unaffected by orchidopexy.
- Higher incidence in white men.

Pathology

Classification of testicular tumours

- Germ-cell tumours (90%) (secrete AFP and β -HCG):
 - seminoma;
 - non-seminoma—embryonal carcinoma, teratocarcinoma, choriocarcinoma.
- Stromal tumours:
 - Leydig cell;
 - Sertoli cell;
 - granulosa cell.
- Metastatic tumours.

Staging

- Stage I: confined to scrotum.
- Stage II: spread to retroperitoneal lymph nodes below the diaphragm.
- Stage III: distant metastases.

Spread

- Germ-cell tumours metastasize to the para-aortic nodes, lung and brain.
- Stromal tumours rarely metastasize.

Clinical features

- Painless swelling of the testis often discovered incidentally

or after trauma.

- Vague testicular discomfort.
- Rarely evidence of metastatic disease or gynecomastia.
- Examination reveals a hard, irregular, non-tender testicular mass.

Investigations

- Blood for tumour markers, i.e. AFP and β -HCG.
- AFP is elevated in 75% of embryonal and 65% of teratocarcinoma.
- AFP is *not* elevated in pure seminoma or choriocarcinoma.
- β -HCG is elevated in 100% of choriocarcinoma, 60% embryonal carcinoma, 60% teratocarcinoma and 10% of pure seminoma.
- Scrotal ultrasound.
- Chest X-ray to assess lungs and mediastinum.
- CT scan of chest and abdomen to detect lymph nodes.
- Laparoscopy (retroperitoneoscopy) to assess abdominal nodes.

Management

- Orchiectomy (via groin incision) and histological diagnosis.
- Further treatment depends on histology and staging.

Seminoma

- Stage I: radiotherapy to abdominal nodes.
- Stage II: radiotherapy to abdominal nodes.
- Stage III: chemotherapy (bleomycin, etoposide, cisplatin).

Non-seminoma germ cell

- Stage I: RPLND.
- Stage II: chemotherapy + RPLND.
- Stage III: chemotherapy.

Prognosis

- Overall cure rates are over 90% and node negative disease has almost 100% 5-year survival.

72 Urinary incontinence

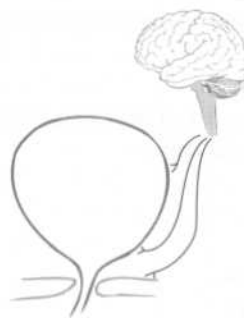
TYPES



STRESS
Pelvic floor injury



URGE
Detrusor instability



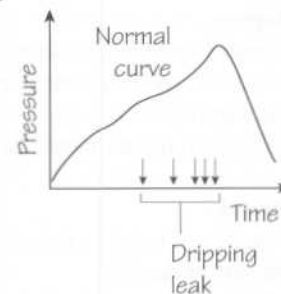
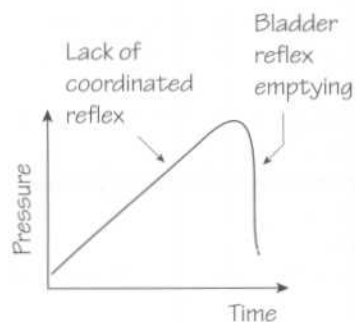
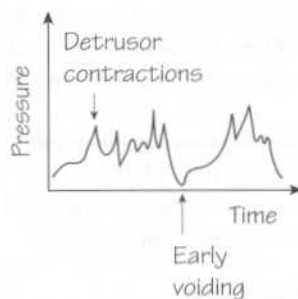
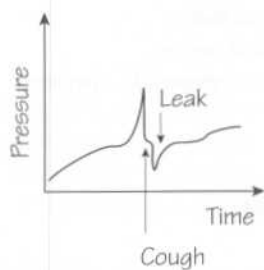
NEUROPATHIC
Head injury
Spinal injury
Peripheral nerve injury



ANATOMICAL
Vesicovaginal fistula

FEATURES

Volume infusion graphs



TREATMENT



Ventral suspension
• Burch
• Starmey

Anti-UTI
Vaginal oestrogens
Anticholinergics



Catheter
• Indwelling
• Intermittent



Repair



Ant. vaginal repair

Definition

Urinary incontinence is defined as the involuntary loss of urine.

Physiology

The normal bladder capacity is 350–400 ml. As the bladder fills with urine, the detrusor muscle relaxes to accommodate the rise in volume without a rise in pressure (plasticity). When the bladder is full, stretch receptors in the bladder wall initiate a reflex contraction (via S3,4) of the detrusor muscle and relaxation of the urinary sphincter to empty the bladder. This spinal reflex is controlled by an inhibitory cortical mechanism which allows conscious control over micturition. Conscious control develops during early childhood.

Classification

Anatomical abnormalities and predisposing factors are listed below.

Urethral incontinence

- Urethral abnormalities: obesity, multiparity, difficult delivery, pelvic fractures, post-prostatectomy.
- Bladder abnormalities: neuropathic or non-neuropathic detrusor abnormalities, infection, interstitial cystitis, bladder stones and tumours.
- Non-urinary abnormalities: impaired mobility or mental function.

Non-urethral incontinence

- Urinary fistula: vesicovaginal.
- Ureteral ectopia: ureter drains into urethra (usually a duplex ureter).

Pathophysiology

- Urine leakage occurs when intra-abdominal pressure exceeds urethral pressure (e.g. coughing, straining or lifting): *stress incontinence*. This usually happens in the presence of urethral incompetence.
- Loss of cortical control results in an uninhibited bladder with unstable detrusor contractions due to *detrusor hyper-reflexia*. The bladder fills, the sacral reflex is initiated and the bladder empties spontaneously.
- Damage to the efferent fibres of the sacral reflex causes bladder atonia. The bladder fills with urine and becomes grossly distended with constant dribbling of urine: *overflow incontinence*. Chronic bladder distension from obstruction produces a similar picture.
- Idiopathic detrusor instability causes a rise in intravesical pressure and urine leakage: *urge incontinence*.

Clinical features

- Stress incontinence: loss of urine during coughing, straining, etc. These symptoms are quite specific for stress incontinence.
- Urge incontinence: inability to maintain urine continence in the presence of frequent and insistent urges to void.

- Nocturnal enuresis: 10% of 5-year-olds and 5% of 10-year-olds are incontinent during sleep. Bed wetting in older children is abnormal and may indicate the presence of an unstable bladder.
- Symptoms of urinary infection (frequency, dysuria, nocturia), obstruction (poor stream, dribbling), trauma (including surgery, e.g. abdomino-perineal resection), fistula (continuous dribbling), neurological disease (sexual or bowel dysfunction) or systemic disease (e.g. diabetes) may point to an underlying cause.

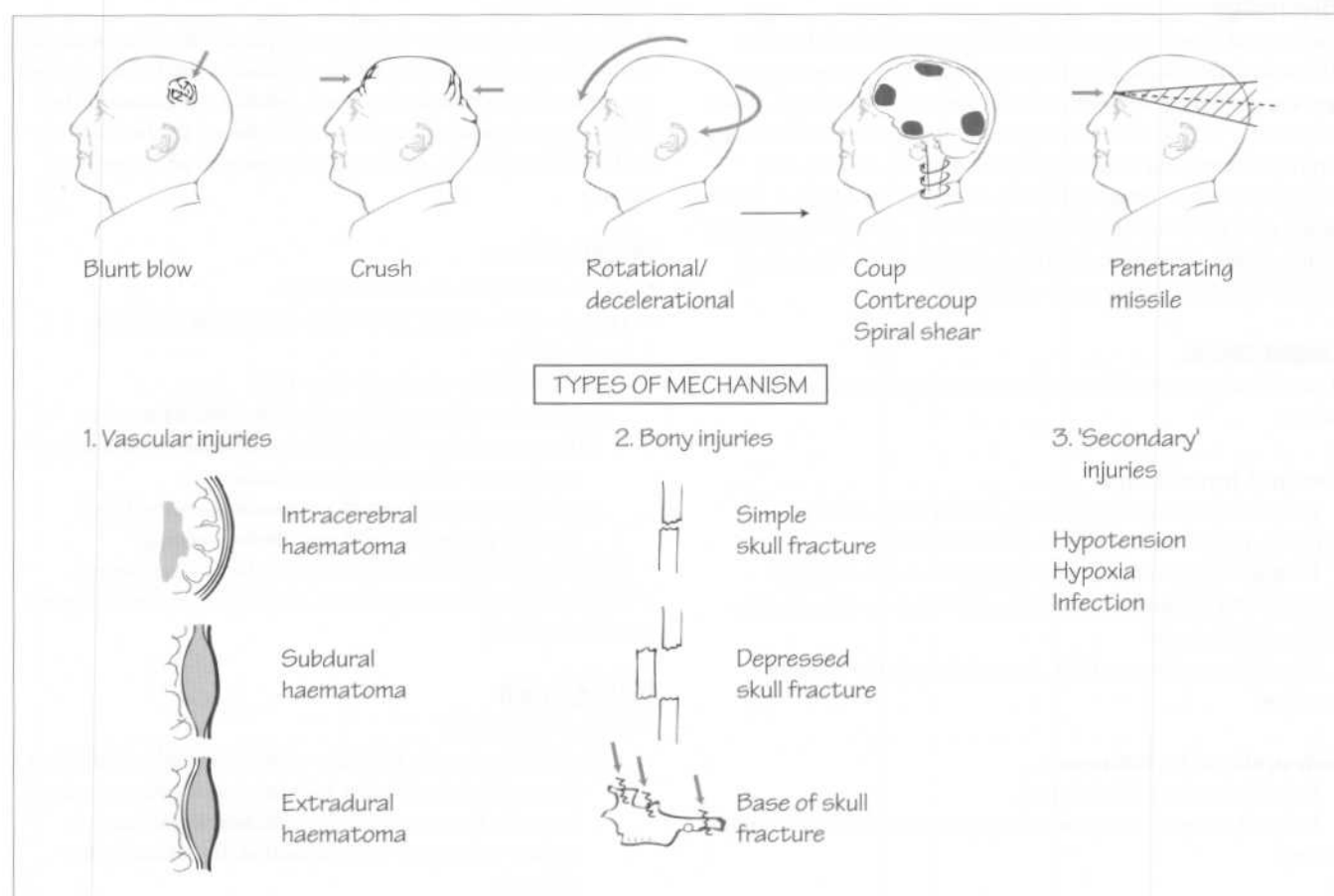
Investigations

- Urine culture: to exclude infection.
- IVU: to assess upper tracts and obstruction or fistula.
- Urodynamics:
 - uroflowmetry: measures flow rate;
 - cystometry: demonstrates detrusor contractures;
 - video cystometry: shows leakage of urine on straining in patients with stress incontinence;
 - urethral pressure flowmetry: measures urethral and bladder pressure at rest and during voiding.
- Cystoscopy: if bladder stone or neoplasm is suspected.
- Vaginal speculum examination ± cytogram if vesicovaginal fistula suspected.

Management

- Urge incontinence.
 - Medical treatment: treat any underlying cause (infection, tumour, stone); bladder training — gradually increase intervals between voiding; anticholinergic/smooth muscle relaxants — propantheline, flavoxate hydrochloride.
 - Surgical treatment: cystoscopy and bladder distension, augmentation cystoplasty.
- Stress incontinence.
 - Medical treatment: pelvic floor exercises, oestrogens for atrophic vaginitis, sympathomimetic agents (ephedrine) to enhance bladder neck closure.
 - Surgical treatment: retropubic or endoscopic urethropexy, vaginal repair, artificial sphincter.
- Overflow incontinence.
 - If obstruction present: treat cause of obstruction, e.g. by TURP.
 - If no obstruction: short period of catheter drainage to allow detrusor muscle to recover from overstretching, then short course of detrusor muscle stimulants (bethanechol; distigmine). If all else fails, clean intermittent self-catheterization — this is the treatment of choice for neurogenic overflow incontinence.
- Nocturnal enuresis: bladder training, 'lift' children around midnight, use of diary of dry nights, enuresis alarms, imipramine (inhibits detrusor contractions), anticholinergics.
- Urinary fistula: always requires surgical treatment.

73 Head injury/1



Definitions

- A *head injury* is the process whereby direct or decelerating trauma to the head results in skull and brain damage.
- *Primary brain injury* is the damage that occurs to the brain immediately as the result of the trauma.
- *Secondary brain injury* is the damage that develops later as a result of complications.

Epidemiology

Head injury is very common. A million patients each year present to A&E departments in the UK with head injury and about 5000 patients die each year following head injuries.

Pathophysiology

- A direct blow to the head may cause damage to the brain at the site of the blow (*coup* injury) or to the side opposite the blow when the brain moves within the skull and hits the opposite wall (*contrecoup* injury). Similarly, deceleration of the head (e.g. with neck flexion, extension or rotation) results in the brain striking bony points within the skull (e.g. the wing of the sphenoid bone).
- The degree of primary brain injury is directly related to the amount of force applied to the head.
- Secondary damage results from: respiratory complications (*hypoxia, hypercarbia, airway obstruction*), hypovolaemic shock (head injury does not cause hypovolaemic shock, look for another cause), intracranial bleeding, cerebral oedema, epilepsy, infection, hydrocephalus.

Clinical features

- History of direct trauma to head or deceleration.
- Patient must be assessed fully for other injuries.
- Level of consciousness determined by GCS (Table 3). Fully conscious: GCS = 15; deep coma: GCS = 3.

Table 3 The Glasgow Coma Scale.

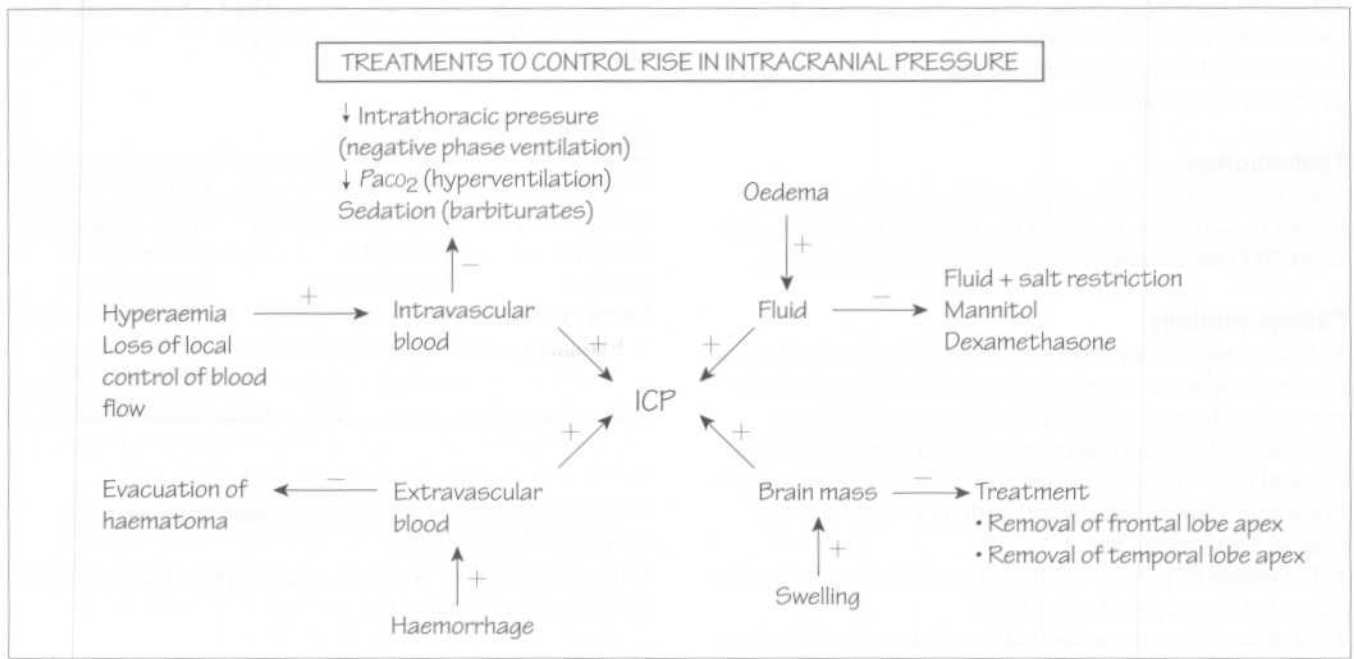
Eye opening	Voice response	Best motor response
Spontaneous 4	Alert and orientated 5	Obeys commands 6
To voice 3	Confused 4	Localizes pain 5
To pain 2	Inappropriate 3	Flexes to pain 4
No eye opening 1	Incomprehensible 2	Abnormal flexion to pain 3
	No voice response 1	Extends to pain 2
		No response to pain 1

- Pupillary inequalities or abnormal light reflex indicate intracranial haemorrhage.
- Headache, nausea, vomiting, a falling pulse rate and rising BP indicate cerebral oedema.

Investigations

- Skull X-ray: AP, lateral and Towne's views.
- CT/MRI scan: show contusions, haematomas, hydrocephalus, cerebral oedema.

Head injury/2



Management

Trivial head injury

- The patient is conscious, may be history of period of unconsciousness (LOC). Retrograde amnesia for events prior to head injury is significant.

Indications for skull X-ray

- LOC or amnesia.
- Neurological signs.
- CSF leakage.
- Suspected penetrating injury.
- Alcohol intoxication.
- Difficulty in assessing patient.

Indications for admission

- Confusion or reduced GCS.
- Skull fracture.
- Neurological signs or headache or vomiting.
- Difficulty in assessing patient.
- Coexisting medical problem.
- Inadequate social conditions or lack of responsible adult to observe patient.

Indications for neurosurgical referral

- Skull fracture + confusion/decreasing GCS.
- Focal neurological signs or fits.
- Persistence of neurological signs or confusion for >12 hours.
- Coma after resuscitation.
- Suspected open injury to skull.
- Depressed skull fracture.
- Deterioration.

Severe head injury

- Patient will arrive unconscious to A&E department. Head injury may be part of a multiple trauma.
- ABC (see p. 57). Intubate and ventilate unconscious patients to protect airway and prevent secondary brain injury from hypoxia.
- Resuscitate patient and look for other injuries especially if the patient is in shock. Head injury may be accompanied by

cervical spine injury and the neck must be protected by a cervical collar in these patients.

- Treat life-threatening problems (e.g. ruptured spleen) and stabilize patient before transfer to neurosurgical unit. When transferring ensure adequate medical supervision (anaesthetist + nurse) during transfer.

Complications

Skull fractures

- Indicate severity of injury. No specific treatment required unless compound, depressed or associated with chronic CSF loss (e.g. anterior cranial fossa basal skull fracture).

Intracranial haemorrhage

- Extradural haemorrhage: tear in *middle meningeal artery*. Haematoma between skull and dura. Often a 'lucid interval' before signs of raised intracranial pressure ensue (falling pulse, rising BP, ipsilateral pupillary dilatation, contralateral paresis or paralysis). Treatment is by evacuation of haematoma via burr holes.
- Acute subdural haemorrhage: tearing of *veins* between arachnoid and dura mater. Usually seen in elderly. Progressive neurological deterioration. Treatment is by evacuation but even then recovery may be incomplete.
- Chronic subdural haematoma: tear in vein leads to subdural haematoma which enlarges slowly by absorption of CSF. Often the precipitating injury is trivial. Drowsiness and confusion, headache, hemiplegia. Treatment is by evacuation of the clot.
- Intracerebral haemorrhage: haemorrhage into brain substance causes irreversible damage. Efforts are made to avoid secondary injury by ensuring adequate oxygenation and nutrition.

Prognosis

- Prognosis is related to level of consciousness on arrival in hospital.

GCS on admission

15

8–12

<8

Mortality

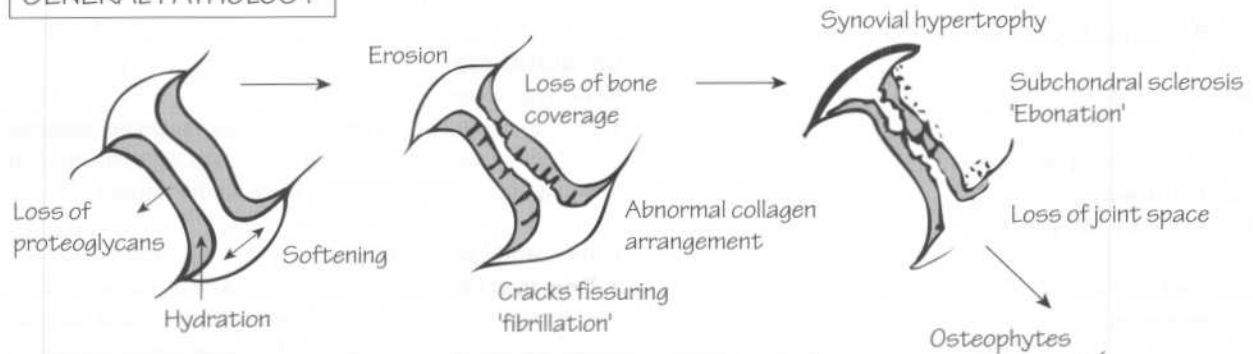
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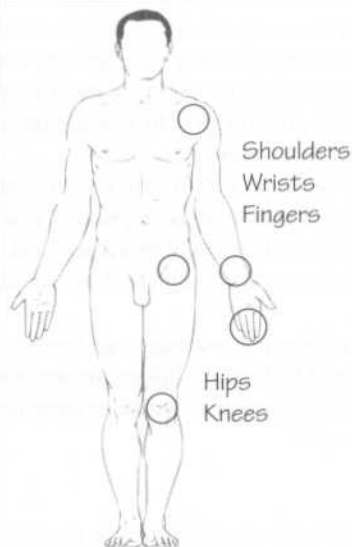
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74 Osteoarthritis

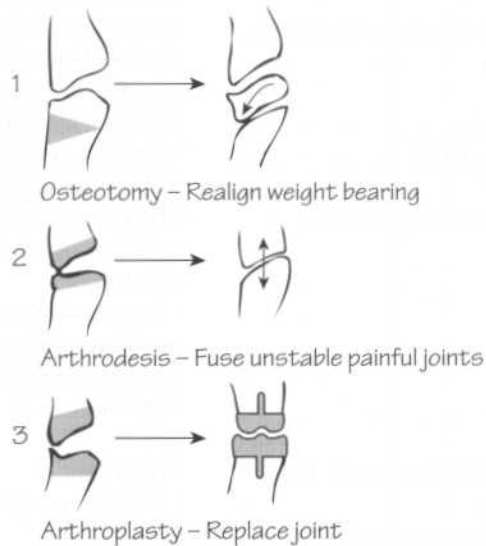
GENERAL PATHOLOGY



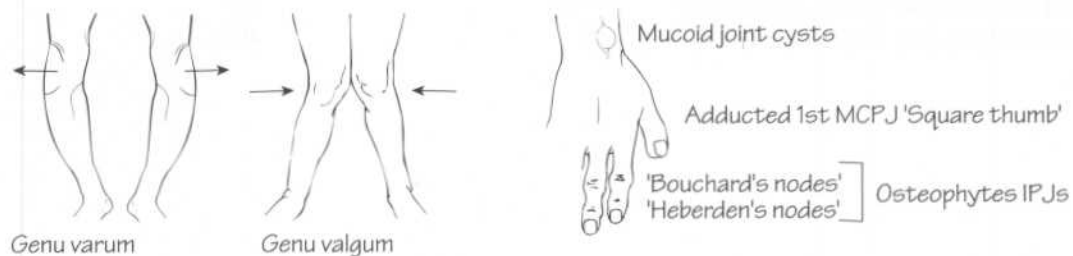
DISTRIBUTION



PRINCIPLES OF SURGERY



FEATURES



Definition

Osteoarthritis is a degenerative joint disease involving damage to the cartilage-bearing surfaces of the involved joint characterized by pain and limitation of movement.

Epidemiology

Females > males. Age 40s and 50s onwards.

Aetiology

Primary osteoarthritis

- Increased mechanical stress to the joint.
- Poor cartilage nutrition.
- Cartilage fragments.

Secondary osteoarthritis

- Congenital: congenital dislocation of the hip.
- Childhood: Perthe's disease, infection.
- Trauma: fracture into a joint, cartilage tear.
- Metabolic: gout, crystal arthropathy.
- Infection: TB.
- Chronic inflammation: rheumatoid arthritis.

Pathology

- Progressive degradation of articular cartilage leads to joint narrowing, subchondral bone thickening, bone cysts and peripheral bone nodules (osteophytes). Altered proteoglycan metabolism in the joint may be the biochemical stimulus to cartilage degeneration.

Clinical features

- Joint pain and loss of function.
- Stiffness.
- Tiredness, especially towards the end of the day.

- Limitation of joint movement because of pain.

Investigations

- AP and lateral X-ray of the affected joint: joint space narrowing, osteophytes, bone cysts, subchondral sclerosis.

Management

The aim of management is pain relief and return of function.

The degree of pain the patient is suffering is the deciding factor in how aggressive the treatment should be.

Non-surgical management

- Weight loss.
- Physiotherapy.
- Drug therapy:
 - NSAIDs;
 - local steroid injection.

Surgery

- Arthroplasty: joint replacement is very successful and is the surgical option of choice for osteoarthritis of the hip and knee joints in the elderly.
- Arthrodesis: fusion of a joint in a position of function may provide useful relief in a young person with severe wrist or ankle disease.
- Osteotomy: realigns the joint and may have a role in young patients with a good range of movement. Not often performed.

Prognosis

- At present there is no treatment available that stops the progress of cartilage degeneration. All therapy can therefore be considered palliative, although this is very effective, especially in relation to arthroplasty.

75 Rheumatoid arthritis

GENERAL JOINT PATHOLOGY



Synovitis
Bursitis
Effusion



Pannus formation
Synovial thickening
Periarticular
osteophytes



Total loss of
cartilage
Synovial joint
fusion → deformity
Loss of bone mass

Cyst formation
Cartilage destruction

SYSTEMIC FEATURES

Sjögren's syndrome
(Epi)scleritis

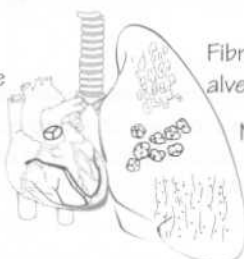


Raynaud's
syndrome



Poor skin
• Bruising

Aortic
incompetence



Fibrosing
alveolitis

Nodules

Interstitial
fibrosis

Conduction
defects
Pericarditis



Bowel ischaemia



Nephropathy
Amyloidosis
Stones

Anaemia
Iron deficiency
Weight loss
Fever



Peripheral neuropathy

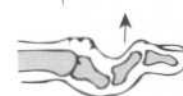
Ulcers

Distal vasculitis

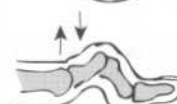
JOINT FEATURES



'Ulnar deviation'
• Fingers
• Wrist



'Swan neck' finger



'Butoniere' finger



'Mallet' finger



Hammer toes
Loss of foot arches



Atlanto-axial
subluxation
Cervical
instability

Definition

Rheumatoid arthritis is a generalized (autoimmune) disease characterized by inflammation of the synovium with progressive peripheral joint erosion, destruction and deformity and systemic manifestations in 30% of patients.

Epidemiology

Female/male 1:3. Young and middle-aged adults. Occurs in about 1–3% of the population.

Aetiology

- Genetic: associated with HLA-DRW4.
- Hormonal: commoner in females, onset between menarche and menopause, improves with pregnancy.
- Immune mechanism: immune complexes (IgG, IgM and complement) are found in the joints and serum of patients. IgG production is stimulated and in turn acts as an antigen, triggering the production of antibodies, IgM (rheumatoid factor).
- Infection: autoimmunity may be triggered by an infection.

Pathology

- In response to an unknown stimulus (?virus) the synovial membrane thickens and folds into a 'pannus', which erodes the articular cartilage and adjacent bone.
- There is an increase in volume of synovial fluid, which contains protein (IgG) and PMNs.
- Immune complexes are phagocytosed by PMNs with release of lysozymes and further destruction.
- T lymphocytes may also play a role.

Clinical features

- Pain, swelling and symmetrical deformity of the small joints of the hand. Large joints may be affected, but not symmetrically.
- Early-morning stiffness.
- Functional impairment (loss of hand grip strength).
- Constitutional symptoms: malaise, tiredness.

Hands

- MCP joint swelling and subluxation.
- PIP joint swelling, 'spindling'.

- 'Button hole' and 'swan neck' deformity.
- Extensor tendon rupture, finger drop.
- Ulnar deviation of the fingers and hand.
- Carpal tunnel syndrome.

Non-articular manifestations

- Skin: rheumatoid nodules.
- Cardiac: myocarditis, pericarditis.
- Vascular: vasculitis.
- Haemopoietic: anaemia, splenomegaly.
- Pulmonary: fibrosing alveolitis/pleural effusion.
- Neurological: entrapment neuropathy.
- Eye: keratoconjunctivitis, episcleritis.

Investigations

- FBC: anaemia common.
- Rheumatoid factor: positive in 75% of patients.
- X-ray joints: soft tissue thickening, juxta-articular osteoporosis, loss of joint space, subluxation.

Management

The aim of management is pain relief and return of function.

Medical management

- Physiotherapy and occupational therapy for exercise/splintage and provision of aids for activities of daily living.
- Drug therapy:
 - NSAIDs;
 - local steroid injections;
 - gold, penicillamine, sulphasalazine, chloroquine, azathioprine, methotrexate.

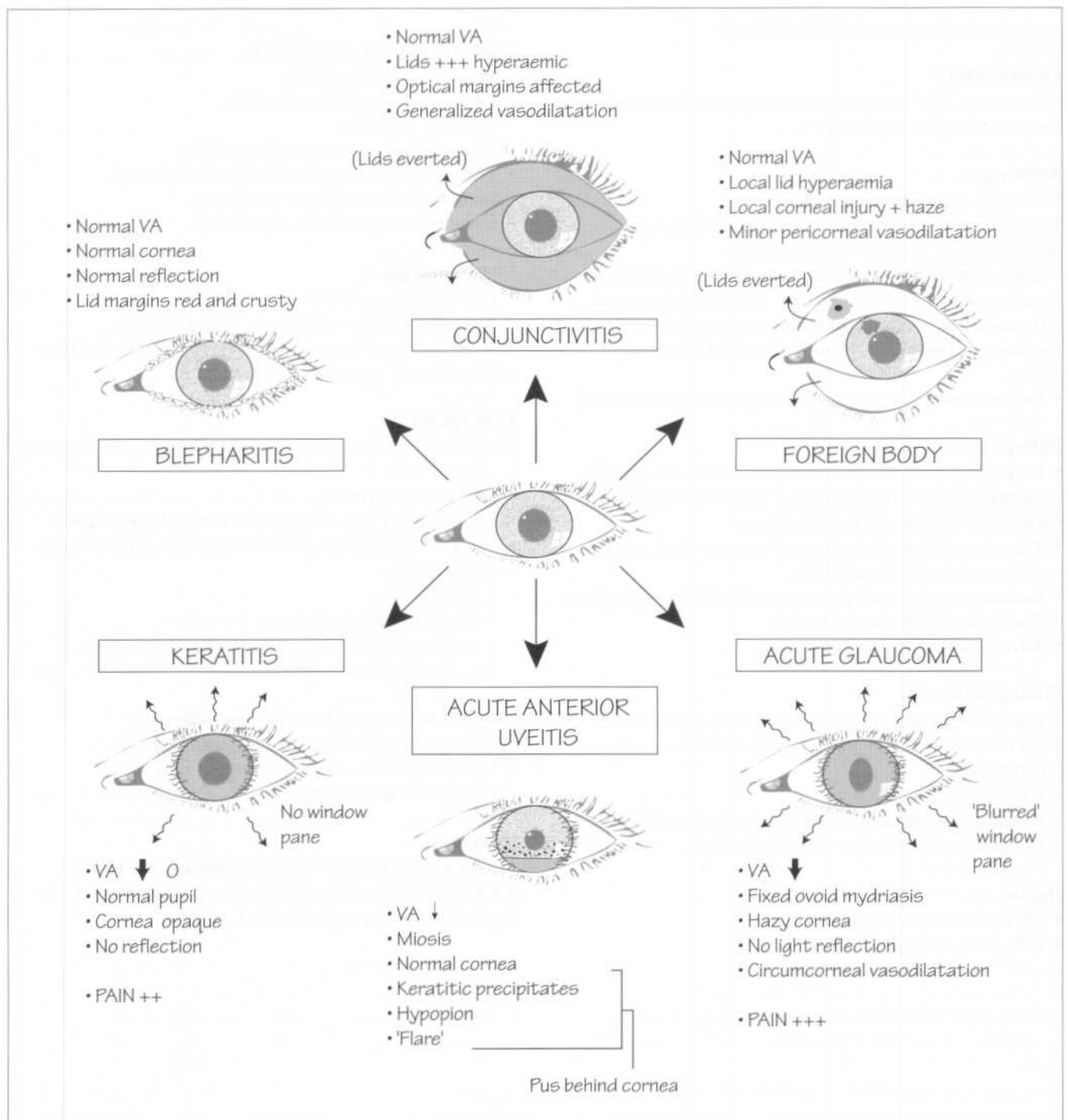
Surgery to improve function not deformity

- Synovectomy useful at wrist to remove pannus.
- Ruptured tendons should be repaired early.
- Arthrodesis and arthroplasty.

Prognosis

- Rheumatoid arthritis is a chronic disease, but 60% of patients have only moderate impairment of activities. Forty per cent become severely disabled.

76 The acute red eye



Definition

The *acute red eye* is a physical sign characterized by redness of all or part of the conjunctiva or sclera $\pm$ discomfort in the eye.

Causes

- Conjunctivitis.
- Foreign body.
- Anterior uveitis, iritis, iridocyclitis.
- Acute glaucoma.
- Episcleritis and scleritis.
- Subconjunctival haemorrhage.

Conjunctivitis

Clinical features

- Inflammation of the conjunctiva.
- Red eye with sticky discharge especially after sleep.
- Pupil is normal and vision is not impaired.

Common causes

- *Staphylococcus aureus*, *Haemophilus influenzae*, *Pseudomonas*.
- Virus.
- *Chlamydia trachomatis*.
- Herpes simplex.
- Allergic reaction.

Treatment

- Topical antibiotics 2-hourly.
- Settles spontaneously.
- Tetracycline, systemic or topical.
- Idoxuridine, acyclovir.
- Topical steroids but only under expert supervision.

Foreign body

A conjunctival or corneal foreign body is a common cause of red eye. May or may not be history of trauma.

Clinical features

- Painful 'gritty' eye.
- Pupil normal and vision not impaired.

Treatment

- Topical anaesthesia to examine eye properly.
- Evert upper lid to exclude subtarsal foreign body.
- Irrigate out superficial foreign body or remove with cotton wool.
- Foreign body embedded in cornea has to be removed with needle tip or drill.
- Topical antibiotics and eye pad for 24–48 hours following removal.

Uveitis, iritis, iridocyclitis

Clinical features

- Inflammation of all or part of the uveal tract.
- Red eye with circumcorneal injection.
- Constant 'aching' pain in eye and photophobia.
- The pupil is *small* and fixed and the anterior chamber may be turgid.
- Intraocular pressure is normal.

Causes

- Ankylosing spondylitis.
- Psoriasis.
- Sarcoidosis.
- Crohn's disease.
- Ulcerative colitis.
- Syphilis, TB.

Treatment

- Treat underlying cause.
- Topical steroids.
- Pupillary dilators.

Acute glaucoma

Precipitated by narrowing of the drainage angle between iris and cornea. This is a medical emergency as blindness will ensue if not treated promptly.

Clinical features

- Red eye with injected conjunctiva and iris.
- Severe 'aching' pain.
- Patient sees halos with rainbow pattern around white light.
- Pupil is dilated, fixed and oval.
- Intraocular pressure is very high.

Treatment

- Acetazolamide 500 mg i.v. to reduce aqueous production.
- Pilocarpine drops to constrict the pupil and widen the drainage angle.
- Topical steroids and β -blockers to reduce intraocular pressure.
- Occasionally i.v. mannitol is required.

Episcleritis and scleritis

- Localized inflammation of the sclera.
- Small oval slightly raised red area on the sclera.
- May be 'aching' pain or not.

Causes

- Allergic.
- Rheumatoid arthritis.
- Polyarteritis nodosa.
- Wegener's granulomatosis.

Treatment

- Treat underlying cause if any identified.
- Topical steroids.

Conjunctival and subconjunctival haemorrhage

- A conjunctival haemorrhage is in the conjunctiva and is usually due to trauma.

- A subconjunctival haemorrhage is a painless collection of blood under the conjunctiva. It is associated with anterior cranial fossa fracture and the posterior limit of the haematoma cannot be defined.
- Neither require specific treatment.

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